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The AUTOMOBILE

United States Has 1,735,369 Cars

Registration to October 1 Shows Gain of 203,503 Over Statistics Up to July

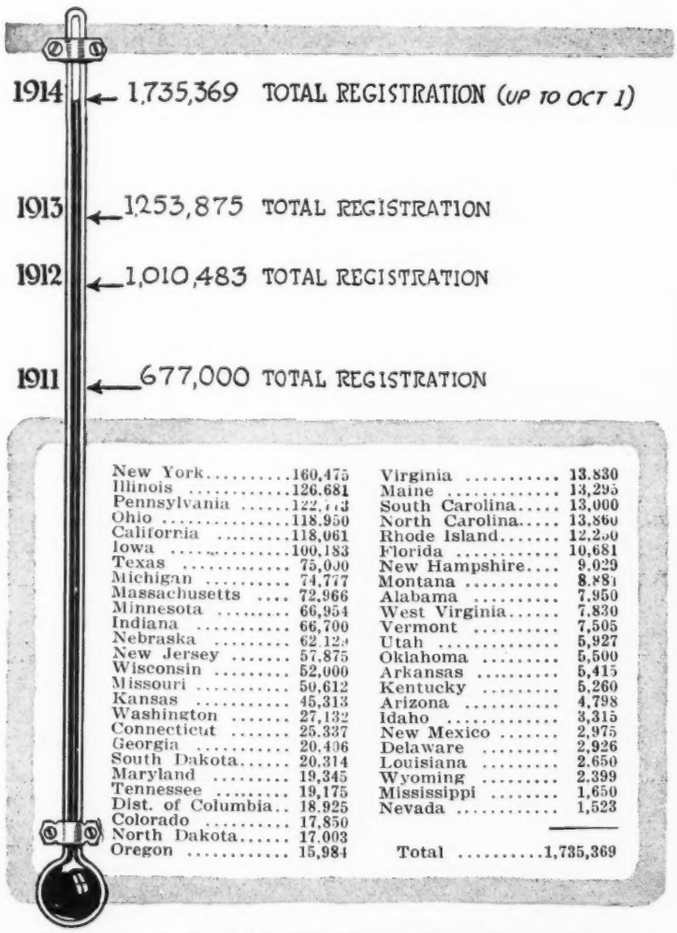
By Donald McLeod Lay

BEARING out the indications of the early part of the year automobile registrations for 1914 bid fair to eclipse all previous records, for the registration officials of the various states report increases in every instance save one, the total registration on October 1 being 1,735,369 after all duplicate registrations have been deducted.

These figures of course include both gasoline and electric vehicles as well as a large number of steam machines. In arriving at the total given all cases of duplicate registration due to the registration of non-residents in the various states and the re-registration of cars upon transfer of ownership are subtracted. Without allowing for this duplication the grand total of registrations is 1,758,253, the non-resident registration in the country totaling 7,332 while the re-registrations amount to 15,552, a total of 22,844.

On January 1, 1914, allowing for duplicate registrations, there were 1,253,875 cars and trucks in use in the United States. By July 1 there had been an increase of 294,485 over this figure, the total being 1,548,350. The increase in registration from July 1 to October 1 is 203,503, or practically two-thirds as much as the gain for the entire 6 months preceding July 1. It is evident that in spite of the talk of hard times and the effect of the European war upon business, the people of the United States are buying cars in great numbers just as they have been for the past decade. In fact the automobile industry has become one of the most important as well as one of the most spectacular in the country, so much so in fact that it formed the subject of a widely quoted address by William Livingstone, President of the Dime Savings Bank, Detroit, at the Annual Convention of the American Bankers' Assn. held at Richmond, Va., October 15.

The present standing of

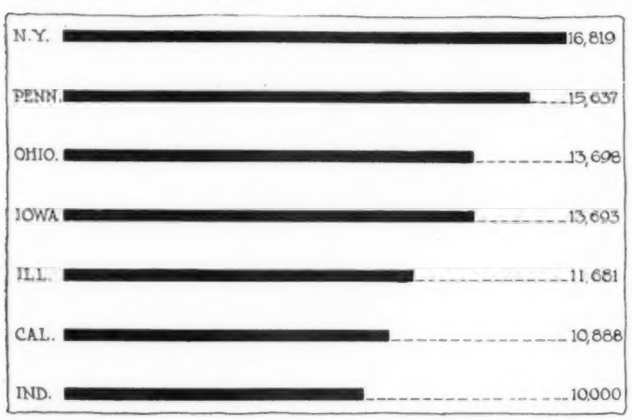


Registration to October 1, 1914, allowing for duplicate registration

Map showing actual registration of automobiles and motor trucks up to October 1, 1914, excluding duplicate registration

the states in respect to automobiles and motor trucks registered can be seen by referring to the tabulation on page 787 where they are arranged in order of magnitude of registration. It is greatly to be regretted that so few states have systematic, businesslike methods of keeping their registration records, as the failure to do so renders it impossible to tell the number of vehicles of various types and classes. The table on page 789 is an actual illustration of this, showing how few registration officials are really able to tell how many gasoline, electric and steam passenger cars and how many trucks there are in the state.

New York has taken a big leap forward in registration during the 3 months from July 1 to October 1, its total now being 160,475 after all duplicate registrations have been allowed for. This represents a gain of 16,819. Illinois is still in second place with 126,681, a gain of 11,681 for the 3 months. Third place is held by Pennsylvania with 122,773 or 15,637 more than on July 1. California has been ousted from fourth place by Ohio which now has 118,950 or 13,698 more than at the last showing. California's gain is 10,888 giving that state a total of 118,061. Iowa shows the phenomenal gain of 13,693, its registration being 100,183. Texas, Michigan, Massachusetts, Minnesota, Indiana, Nebraska and New Jersey retain their positions in order just as in July, their registrations ranging from 75,000 down to 57,875. Wisconsin has passed Missouri with a registration of 52,000 to Missouri's 50,612. The rest of the states are all below 50,000 ranging from Kansas with 45,313 down to Nevada with 1,523.



Seven states showed increases of 10,000 or over cars and trucks in the 3 months from July 1 to October 1

Many Changes Below 50,000

The order of the states with registrations below 50,000 is greatly changed since July 1, Washington having passed Connecticut with 27,132 as compared with the Nutmeg State's 25,337. South Dakota has passed Maryland, Tennessee and Colorado and farther down the list many other changes are to be seen.

There are five states with registrations between 50,000 and 20,000, these being Kansas, Washington, Connecticut, Georgia and South Dakota. The number between 20,000 and 10,000 comprises over twice as many states, the twelve being Maryland, Tennessee, District of Columbia, Colorado, North Dakota, Oregon, Virginia, Maine, South Carolina, North Carolina, Rhode Island and Florida. There are nine states with registrations between 10,000 and 5,000, these being New Hampshire, Montana, Alabama, West Virginia, Vermont, Utah, Oklahoma, Arkansas and Kentucky. The balance, comprising Arizona, Idaho, New Mexico, Delaware, Louisiana, Wyoming, Mississippi and Nevada, have less than 5,000 cars and trucks each.

Order of Gains Made

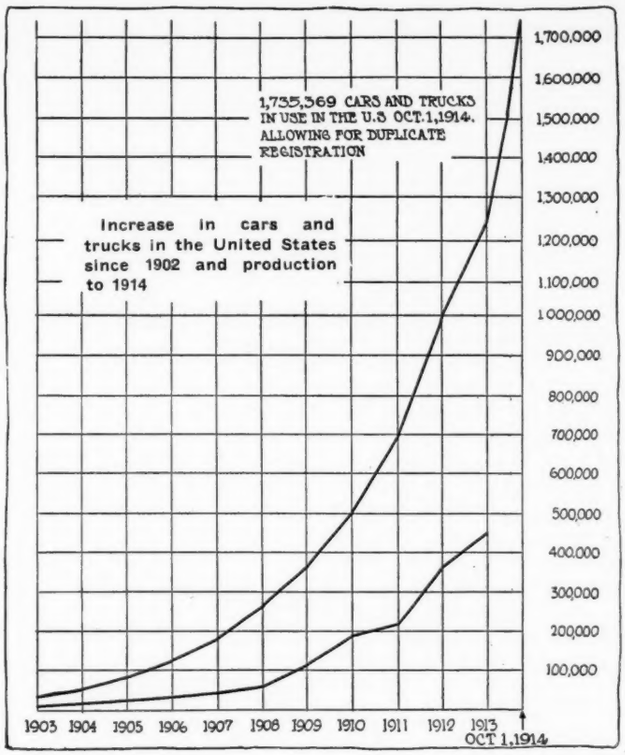
The order of standing in regard to the number of cars and trucks gained by each of the seven states leading in this respect is illustrated in the chart at the left of this page. New York leads with an increase of 16,819 with Pennsylvania second, its gain being 15,637. Ohio is third with an increase

of 13,698 and Iowa fourth with 13,693. Illinois shows 11,681 more registrations than on July 1 giving it fifth place while California with 10,888 takes precedence over Indiana with 10,000. The other states showing gains of over 5,000 registrations for the 3 months are not illustrated but stand as follows. Michigan is eighth with 9,260, Massachusetts, ninth with 9,129, and Missouri tenth with 7,889. New Jersey has 7,568, Wisconsin 7,000, Washington 6,496, Nebraska 6,140, Montana 5,700, Kansas 5,424 and Texas 5,000.

The Law Situation

One welcome improvement in the automobile law situation is the prospective adoption of an automobile law requiring registration of automobiles and trucks by Louisiana. This is one of the few states which has not as yet had a law requiring state registration. South Carolina and Texas are other states where registration is local. The District of Columbia, Florida and Texas require registration but once in contrast to the yearly registration required by the other states, excepting Minnesota, which provides for the registration of its motor vehicles once every 3 years. The Michigan and Mississippi laws are still under the ban of the courts, having been held unconstitutional some time ago. It is considered likely that the Michigan statute will be amended and re-adopted.

In the twenty-one states where statistics were available on the subject there were a total of 310,377 chauffeurs registered. There are six states in which the registration of chauffeurs is not required. The total of the fees received for the first 9 months of 1914 is $8,817,654.



Automobile Registration in Each State in the Union up to October 1, 1914, with Duplicate Registrations

State or Territory	Total Registration	New Registration	Registration up to July 1, 1914	Gasoline Passenger Cars in Use	Gasoline Commercial Cars in Use	Electric Passenger Cars in Use	Electric Commercial Cars in Use	Non-Resident Registration*	Re-Registered**	Chauffeurs Registered	Total Fees	Remarks
Alabama	8050	450	7,500	7,700	250	150	None	None	100	750	$153 000	
Arizona	4 863	570	4,293	4,577	228	16	None	Very few	65	1,090	2,398	
Arkansas	5,490	795	4,695	***	***	***	***	***	75	300	55,200	
California	118,061	10,888	107,173	***	***	***	***	***	***	16,855	72,688	
Colorado	18,200	1,700	16,500	***	***	***	***	50	300	2,200	66,625	
Connecticut	27,230	2,700	24,530	24,235	2,659	420	220	1,000	893	35,631	394,211	
Delaware	2,972	364	2,608	***	***	***	***	***	46	***	35,000	
Dist. of Col.†††	18,925	1,461	17,464	***	***	***	***	***	***	24,140	16,662	Perennial reg.
Florida	10,681	603	10,078	***	***	***	***	***	***	***	***	Perennial reg.
Georgia	20,516	484	19,000	20,000	16	500	None	10	100	None	103,080	
Idaho	3,315	727	2,588	***	***	***	***	***	***	***	***	
Illinois	126,681	11,681	115,000	***	***	***	***	***	***	14,548	651,101	
Indiana	67,000	10,000	57,000	62,000	2,500	1,200	800	***	300	5,062	426,998	
Iowa	102,250	13,693	88,557	***	***	***	***	***	2,067	***	254,217	
Kansas	45,313	5,424	39,889	***	***	***	***	***	***	***	241,177	
Kentucky††	5,260	.....	6,376	***	***	***	***	***	***	1,317	21,249	New law
Louisiana†	2,650	150	2,500	***	***	***	***	***	***	***	***	Law not yet adopted
Maine	14,219	1,519	12,700	14,091	626	5	2	400	524	18,096	***	
Maryland	19,345	1,097	18,248	17,554	1,691	175	100	***	***	***	***	
Massachusetts	73,846	9,129	64,717	65,116	7,059	923	748	880	***	23,366	894,845	
Michigan	74,777	9,260	65,517	***	***	***	***	***	***	***	221,319	Law invalid
Minnesota	66,954	4,954	62,000	***	***	***	***	***	***	***	***	Triennial reg.
Mississippi†	1,650	150	1,500	***	***	***	***	***	***	***	***	
Missouri	54,032	7,889	46,143	***	***	***	***	None	3,420	6,202	228,813	
Montana	8,881	5,700	3,181	***	***	***	***	***	***	850	***	
Nebraska	62,129	6,140	55,989	***	***	***	***	***	***	***	***	
Nevada	1,523	258	1,265	1,454	69	***	None	***	***	***	***	
New Hampshire	10,189	1,423	8,766	9,766	238	60	20	1,160	***	***	34,119	
New Jersey	59,817	7.568	51,849	***	***	***	***	***	1,942	66,490	784,343	
New Mexico	2,975	539	2,436	***	***	***	***	***	***	***	***	
New York	162,713	16,819	145,894	146,179	1,6534	***	***	2,238	***	62,828	1,484,098	
North Carolina	14,110	2,510	11,600	13,610	500	***	***	250	***	***	85,868	
North Dakota	17,129	2,034	15,095	17,097	17	15	None	6	120	None	54,558	
Ohio	118,950	13,698	105,000	118,763	***	187	***	***	***	***	674,002	
Oklahoma	5,500	1,500	4,000	5,325	25	150	***	***	***	None	***	
Oregon	15,984	1,355	14,629	14,472	1,337	80	38	***	***	***	76,360	
Pennsylvania	128,553	15,637	112,916	112,000	3,500	10,371	2,682	1,100	4,680	26,635	1,160,258	
Rhode Island	12,250	1,250	11,000	11,000	1,250	***	***	***	***	***	***	
South Carolina	13,000	43	12,957	***	***	***	***	***	***	***	***	Local reg.
South Dakota	20,799	4,799	16,200	***	***	***	***	***	485	***	***	
Tennessee	19,175	1,893	17,282	***	***	***	***	***	***	***	***	
Texas	75,000	5,000	70,000	***	***	***	***	***	***	***	***	Local and perennial reg.
Utah	6,032	636	5,396	5,764	149	119	***	5	100	35	4,070	
Vermont	8,073	1,292	6,781	7,859	205	4	5	233	335	2,457	142,397	
Virginia	13,830	2,188	11,642	***	***	***	***	***	***	182	14,815	
Washington	27,132	6,496	20,636	***	***	***	***	None	***	None	54,264	
West Virginia	7,830	1,672	6,158	***	***	***	***	None	***	1,243	137,924	
Wisconsin	52,000	7,000	45,000	***	***	***	***	***	***	None	260,000	
Wyoming	2,399	365	2,034	***	***	***	***	***	***	None	11,995	
Total	1,758,253	203,503	1,554,282	678,562	388,530	14,375	4,615	7,332	15,552	310,277	$8,817,654	

NOTE.—3,250 steam passenger cars and 275 steam trucks are included among the gasoline machines. *The number of cars registered belonging to residents of another state. **Number of cars re-registered owing to changes of ownership, etc. ***Not listed separately by registration officials. †Estimated on basis of population with reference to location and sectional registration. ††New law makes registration figures low. †††Figures are high as many re-registrations are included.

Foreign Trade Is Not Foreign Selling But Barter

Other Countries Also Have Products to Market, Speakers Tell Manufacturers' Export Assn.—Investment Needed and Sane Methods—South America Bankrupt—Wants Money, Not Goods

SEVERAL thoughts upon which little emphasis has been laid to date in the movement for the development of our foreign trade were brought out at the fifth annual convention of the American Manufacturers' Export Assn., which was held at the Hotel Biltmore, New York City, last Thursday. One of the most important of these, which it would seem has been overlooked almost entirely, is that the development of our foreign commerce means, not foreign selling, but barter or exchange; that is, we cannot expect to ship our products to foreign countries and expect cash in return. These countries also have products which they must market.

South America Bankrupt

One of the speakers called attention to the fact that the South American countries are practically bankrupt and want our money, not our goods, while the point was also brought out that the investment of American capital in foreign fields is an indispensable adjunct to our commercial development abroad. Another excellent thought was that business is business the world over; that is, our business men, manufacturers and merchants should proceed about foreign business exactly as they do in transactions at home. Sane methods are needed, because foreign business is the same as domestic, only more difficult.

Merchant Marine Needed

That we need a merchant marine and that the Government should aid American shipbuilding by every means in its power and that officials should help our merchants instead of criticising them were sentiments dwelt upon by several of the speakers. An interesting fact brought out in one of the papers was that the United States has no class of men definitely trained for foreign work. In European countries men make this their vocation and are trained for it, learning foreign languages, currency systems and other things especially serviceable in this work. Two points were emphasized, the men must be adventurous and should not be held down to inadequate expense requirements, nor should they be harrassed by petty bookkeeping in this respect.

A strong hint was made in one of the papers that unless foreign trade is developed by the Government and our merchants, the domestic situation, instead of improving will soon become worse as the country becomes overstocked with native products. No that there are inadequate transportation facilities, for there are plenty of ships to be had, but exporters often hesitate to send out a laden ship in the fear of seizure by belligerent warships.

In all the agitation for extended export trade an important factor which has apparently been entirely neglected is the opening of the Panama Canal which has brought New York, Boston, Philadelphia and the rest of the Atlantic seaboard much closer to the ports of Hong Kong, Shanghai, Melbourne, Sydney, etc. In other words, we, and not Europe, are at the geographical and commercial center of the world.

James A. Farrell, president of the United States Steel Corp., said in part:

"Among the current economic fallacies is that with the present elimination of several of the manufacturing countries of Europe as sources of supply, the neutral consuming markets of the world must look to the United States for their requirements.

Neutrals May Need Help

"Bankers have learned that credit is an international commodity, and producers, whether engaged in farming or manufacturing, are now conscious of the fact that it requires an exchange of commodities between countries to maintain equilibrium of gold exchange. It is apparent that even a neutral nation cannot materially profit when a world-wide contraction exists of the mechanism of credit and the cost of foreign exchange. The problems at present confronting the export and import trade of the United States are largely due to the inability of the foreign buyers to finance transactions on a credit basis, due to straightened financial conditions in many export markets.

"At present there is no lack of shipping facilities, as there are more ships than cargoes to all parts of the world. Our trade is not halted through lack of transportation, but we should analyze this apparent security. The greater part of our oversea commerce is still being carried in foreign ships, and is, therefore, vulnerable to the hazards of war. Up to the present seventy-seven foreign-built vessels, aggregating 275,000 tons, have been transferred to American register, a comparatively small number when it is considered that upward of 2,500,000 of foreign flag tonnage is owned by Americans; but many more vessels would doubtless be transferred to the American flag if prudent revision of our navigation laws were made.

The Federal Reserve Act

"The Federal reserve act has been described as designed to make credit available to every man with energy and assets, and it is to be hoped that this will be true of the foreign aspect of our banking also. It remains to be seen how far the Federal Reserve Board will permit national banks, with their definite domestic responsibilities, to engage, through their foreign branches, in the diversified enterprises by which European banks, organized solely for foreign business, seek to aid the foreign trade of their nations.

"Except for the early dislocation of trade caused by the outbreak of hostilities, Great Britain has, despite the war, continued her foreign trade with little interruption, largely because of the effective emergency measures promptly adopted by the British Government; whereas, we seem to be in an unfortunate position, in that the Federal reserve system, which promises so much for the future, has not as yet been established. Nevertheless, it should be impressed upon our bankers, as well as upon our merchants and manufacturers, that, unless some steps are taken to insure uninterrupted continuance and development of our foreign trade, there will be an unfavorable effect upon our domestic situation.

"Many countries are now turning to the United States for funds. Future opportunities in foreign markets for our manufactures may be seriously lessened unless investment develops."

Herbert R. Eldredge, vice-president of

the National City Bank, said that it is not at all probable that we will have an American merchant marine worthy of the name for many years and only when Congress passes an act placing our ships on an equality in both the cost of operation and the cost of construction with those of our foreign competitors. He told of the plans of the National City Bank to establish branches in South America, and asserted that while these branches would undoubtedly help our exporters in the future efforts to gain trade in those markets, the bank officials realized that they had many obstacles and probably some losses and inconveniences to suffer at the outset. Mr. Eldredge warmly praised the Federal reserve act for its probable beneficial effect upon the development of our foreign commerce, but declared that it must be further amended before it completes its basic task of enabling our bankers to overcome many of the obstacles in the path for many years.

Alba B. Johnson, newly elected president of the association, touched upon the necessity for some form of Government aid for our shipbuilding industry, subsidies or bounties, or otherwise, by which we may hope to meet and overcome the handicap which the foreign shipbuilder and operator now holds of being capable to build and operate ships at a cost of from 40 to 50 and in some instances as much as 60 per cent. below the cost to our American interests.

Defends Our Exporters

William Harris Douglass, of the export commission house of Arkell & Douglass, strongly defended the manufacturers against the many criticisms directed at them during recent years, and more particularly since the war in Europe began, for their alleged lack of efficiency in their efforts to gain greater portions of the world's foreign commerce.

"We have heard more rot about South American trade from every conceivable source," Mr. Douglass asserted, "in the last 60 days than 50 years of trading can hope to overcome. The truth about South America is that she is now bankrupt. I was talking with a prominent banking and trade leader from Brazil only a few days ago, and he very frankly told me that all that South America wants from us just now is our money. I asked him if they did not want our goods, and he said, 'No.' What they want more than our goods is money and plenty of time to pay.

"We must go slowly with South America. Things must be made better down there if our bankers could bring themselves to the point of advancing between $250,000,000 and $500,000,000 to the Latin-American countries, for which they might very easily take over as security national bonds which are backed by the wonderful national and natural resources of the nations down there.

"I resent the criticism heaped upon the American manufacturers for their past efforts in developing export trade. We have done our best, and I resent the criticism simply because we have not seized in a moment the entire export trade of the world. I have traveled the path of progress made by our manufacturers in blazing the way for our expanding foreign commerce for 32 years, during which time, despite the fact that very little help has been given by the Government, we have succeeded in planting a very solid foundation.

Win Trade Despite Handicaps

"It is only 15 years ago that our first steamer went to South America. What are our transportation facilities today and what has the Government done to foster those facilities? Not one passenger boat, but miserable tramp steamers with which to carry our goods to those lands to the south of us. I don't see any prospect of changing that condition. England, on the other hand, has long years ago established freight and passenger lines to every colony she possessed. Let us put the blame where it rests—on the United States Government.

"The Federal Government should not only say that we now have the authority under the law to establish the long-needed foreign branch banks with which we might be able to finance our own obligations and collect our own debts from South America in the course of trading with those countries, but it should make the banks in this country establish the needed branches and if they won't the Government should take some action itself to establish such banking facilities. We also want a real international policy which will insure to us a reasonable open door to every nation of the globe."

Sane Methods Needed

Edward Ewing Pratt, the newly appointed chief of the Bureau of Foreign and Domestic Commerce, Washington, D. C., in an address on The Foreign Trade Situation, made a plea for sane business methods on the part of our exporters in going after increased trade in foreign fields. Mr. Pratt declared that if our manufacturers and exporters will only put into force in foreign fields the same methods as they have been using for years so successfully in the domestic fields they will realize the greatest benefits from their efforts.

"The only difference in essentials between foreign trade and domestic trade is that the foreign proposition is a little more difficult. We are confronted with a great opportunity. The belligerent countries of Europe, which have supplied 42.2 per cent. of the world's exports are not prepared to continue to do so. Yes, it is time to call for caution, but it is always time for that, for caution is one element in business policy. We must not be over-cautious, however.

"Let us get clearly in mind that 'foreign trade' is not 'foreign selling.' Foreign trade is trade, it is exchange. We cannot always sell, we must buy. This is particularly true of our trade with South America. Nor can we afford to make the mistake of supposing that the military orders from Europe indicate any real or permanent demand for American goods. Foreign trade is not a temporary situation, it is a permanent matter.

"Do you realize that the Panama Canal has brought New York, Boston, Philadelphia and the rest of the Atlantic seaboard much closer to the ports of Hong Kong, Shanghai, Melbourne, Sidney, etc., than London, Liverpool and Hamburg now are? In other words, those cities once had the advantage of distance, we have it today. The inference must be clear, we and not Europe are at the geographical and commercial center of the world. The world is our market. Let's get into it."

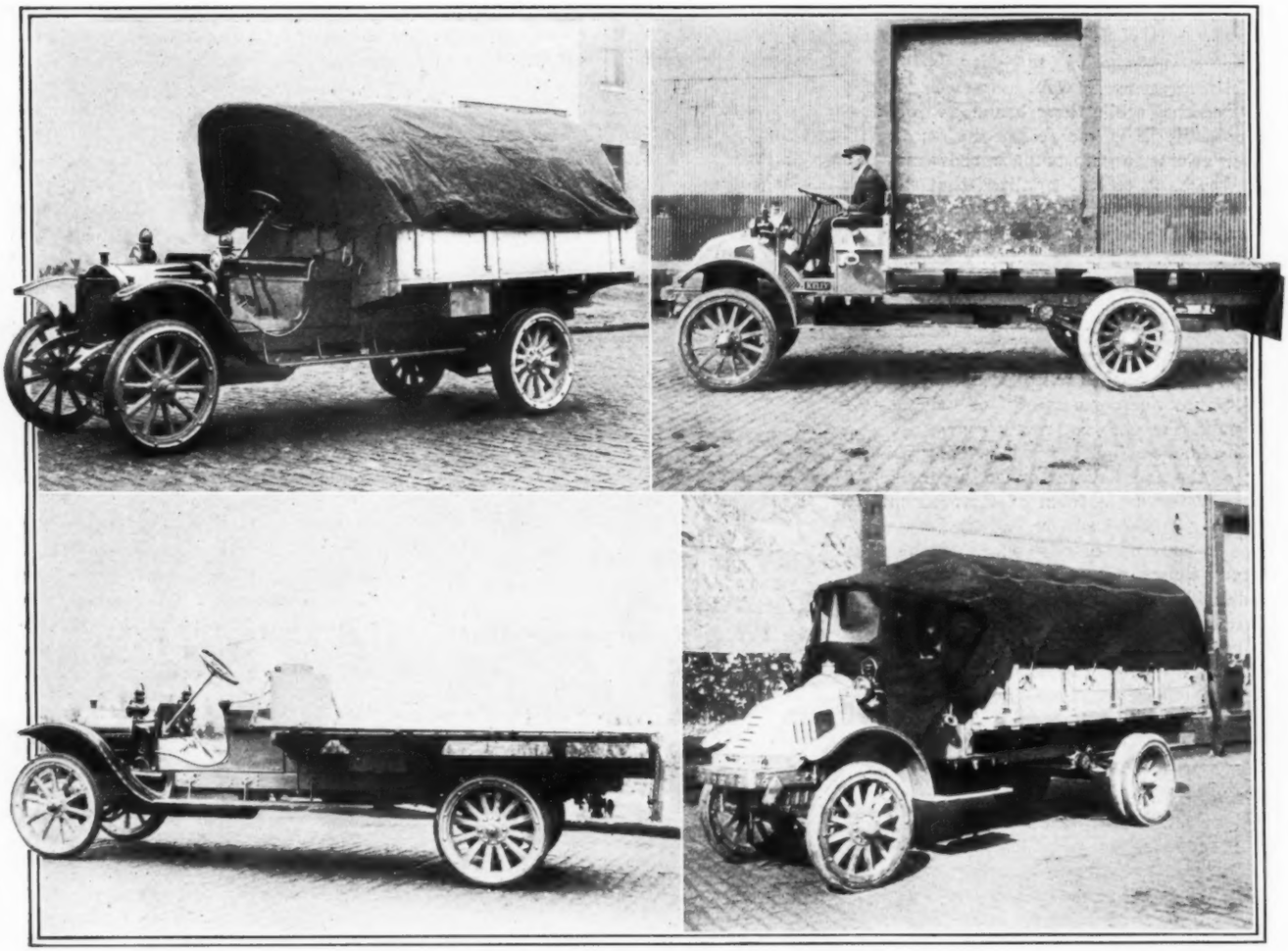
Men for the Work

George H. Richards, manager of the foreign department of the Remington Typewriter Co., in a forcible paper on: "The Personal Factor in Foreign Sales," dwelt at length upon the urgent demand and need for an adequate and efficient force of young American men, who might be capable of going into foreign markets of the world as selling representatives of our exporters.

"The personal factor in invading new markets has thus far not been emphasized," Mr. Richards said. "It is the human and sociological as opposed to abstract commercialism. If we narrow it down it becomes largely a matter of obtaining the proper men, especially young men, in the United States to undertake the work necessary to get our goods from our factories into the hands of our customers in the fields we seek to enter. The fact is that the United States never has had and has not today a class of young men from which to draw for foreign service similar to that to be found among our international competitors. The demand, however, is urgent. The promising candidate must be a man with much the spirit of the pioneer. He must be adventurous. He must be practically footloose. Duty must supersede all other considerations."

Mr. Richards urged that our exporters in selecting such foreign sales agents should not be parsimonious in allowing them sufficient money to cover elaborate social expenses as well as strictly business expenditures. The manufacturers, he added, must realize that traveling abroad is an expensive proposition, the agent's mission being ambassadorial, and his expenses are in proportion.

American Trucks to Play Part in War



Some of the 2-ton truck types purchased by the belligerent European nations. At the upper left is shown a White fitted with tarpaulin top, while below it is the same model with flat open body. At the upper right is a Kelly-Springfield with the same flat type of body and at the lower right is another Kelly-Springfield equipped with tarpaulin top

NEW YORK CITY, Oct. 28—Although reports have been prolific concerning large sales of motor trucks to the belligerent countries of Europe, sales have not aggregated one-third the amount reported. Rumors of concerns in America having orders for 9,000 trucks have been afloat for some time, but to date not more than 3,000 have actually been sold, in fact the total falls a little below this figure. This is a great export business, particularly for a line that has not figured prominently in the export column.

France Buys 1,740

One of the greatest sales was that made to the French government by five concerns, namely, White, Packard, Kelly, Pierce, and Jeffery, a total of 1,740 trucks, all of which have to be delivered by the first of the year. Of this total the sales were divided as follows: White 600; Packard, 450; Kelly 340; Pierce-Arrow 300; and Jeffery 50. These are practically all 2-ton types with the exception of Jeffery which are 1 1-2-ton. The Packard group is divided between 2- and 3-ton models.

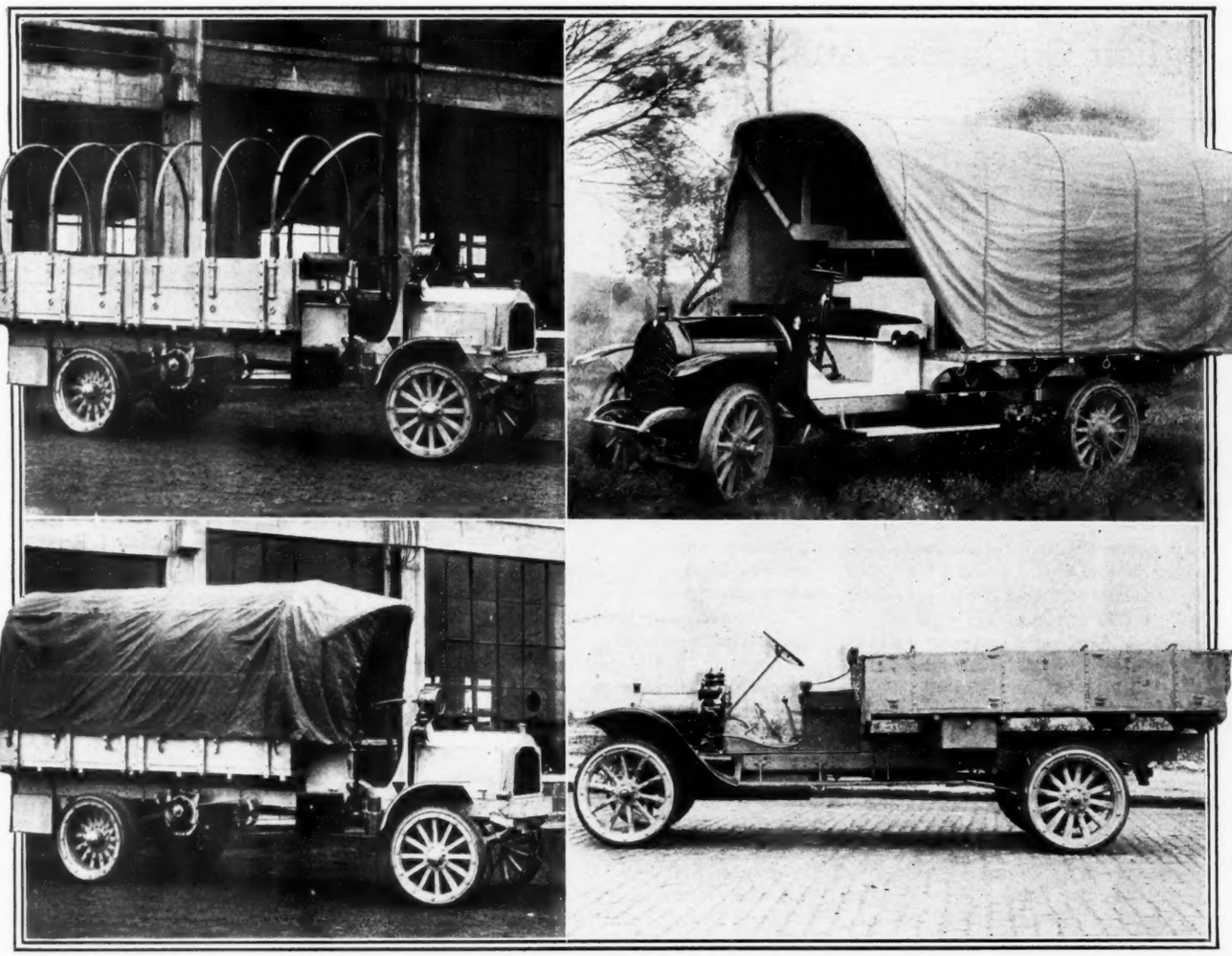
The illustrations on these pages show the conventional types of army body that has been fitted on all of these vehicles. These bodies are good examples of flexibility in that the two sides and tail-board are hinged to swing downwards. The sides are provided with chains to hold them in a horizontal position to make loading and unloading easy.

These bodies can either be used with or without the tarpaulin top. As shown in the Packard illustration these tops are supported by a series of removable metal bows roughly semi-circle in shape and fitting into brackets in the sides of the body. Over these bows the tarpaulin is stretched and secured giving an appearance not unlike the Prairie Schooner of by-gone days.

The Russian Body

The bodies on the White are what are known as the Russian design including the latest improvements. The platform of the body is not horizontal but standing in the rear of the vehicle and looking towards it the floor bows down in the center giving it an arc shape instead of a flat one. This is done in order that the loads carried press toward the center thus avoiding any tendency for loads to tumble off at the sides. On the other bodies the standard French army wagon job is fitted. These have the flat load platform and the hinged

—Several Shipments Already Made



The Packard shown at the upper left gives an idea of the body construction used with the tarpaulin top, the view just below showing the tarpaulin mounted. At the upper right is one of the Jeffery trucks fitted with a tarpaulin top of design similar to that employed on the other vehicle. At the lower right is a White with open box body

sides and tail-board, together with the metal bows for the tarpaulins.

On the Whites, which are the regular 2-ton model, with motor 3 3-4 by 5 1-8, the wheelbase is 145 1-2 inches and tires are 3 1-2-inch solids all around with duals in rear. The load-carrying platform measures 9 feet 6 inches long and 6 feet wide.

The Jeffery's are the standard 1 1-2-ton chassis with 110-inch wheelbase and block motor with cylinders 3 3-4 by 5 1-4. On the other models the standard chassis equipment regularly used is employed.

Other Sales

In addition to these French sales there have been several other shipments to belligerent and non-belligerent countries. Packard sold 198 to the Russian government, these being of 2-, 3- and 5-ton capacities. The Garford company disposed of approximately 142 to the same source and White sold some. Kissel has been making sales to the Greek government, totalling, according to reports, 100 vehicles. The Knox company has sold some few tractors to Greece.

There was a shipment of approximately 150 motor vehicles with the first Canadian contingent, and these included such makes as, Kelly, White, Packard, Peerless, Autocar, Jeffery and Russell. Many other sales have been reported but it is impossible at this time to definitely confirm them.

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Many to Study Car Construction in Milwaukee

MILWAUKEE, WIS., Oct. 26—Hundreds of Milwaukee business men of standing have enrolled in the new course in motor car operation and repair established by the university extension division of the University of Wisconsin at the Milwaukee branch. The course is in charge of LeRoy Roberts, Cornell, '07, and is based, it is stated, on the fact that practically all of the accidents nowadays are caused by the ignorance of owners relative to caring for and driving their cars. Motor troubles uncared for and road laws neglected probably are the two greatest causes of accidents, and the new course, consisting of fifteen evening sessions during the coming winter will not only include instruction in repair and care of the car, but in road laws and driving.

"Seeing Ourselves As Others See Us"

English Engineers Analyze Their Industry in War Atmosphere and Make Recommendations—More Research Needed—Germany Has Led in This Work—Opportunity for America to Supply Raw Materials That Belgium Has Supplied

LONDON, ENG., Oct. 15—That it takes a war to stir up the Britisher patriotically, as well as industrially, is well illustrated by the activity of the Institution of Automobile Engineers, the British automobile engineering organization, as was shown by a recent meeting, when L. H. Pomeroy, a member of the council, presented a lengthy paper entitled, "Automobile Engineering in the War."

Mr. Pomeroy talks with characteristic John Bull frankness in his analysis of the automobile industry as brought about by the present war, condemning the policy of British manufacturers in one sentence and praising the policy of German and Belgian makers in the next.

Germany's Research Work

In speaking of the necessity for systematic research work in the automobile industry, he pays Germany a compliment when he says, "For anything like a systematic series of experiments on the automobile, its efficiency and effectiveness, we have to turn to Germany."

In another sentence he deplores certain inefficiencies in the British manufacturer and shows to what an extent Britain has had to draw on Continental countries for raw materials and parts for assembling.

Compliments Belgium

He pays a compliment to Belgium when, referring to a recent visit of the members of the Institution of Automobile Engineers to Belgian factories in which stampings were manufactured, he says: "Those who participated in the official visit to Belgium cannot fail to have been impressed with the scientific methods of stamping seen there, and, further, the unremitting care with which the product is checked, the elaborate research work which has directed the choice of the material used for the various purposes, its heat treatment, and the investigation of its physical and chemical characteristics."

Mr. Pomeroy brings out many facts which show the possibility of American concerns profiting by the fact that several of the Continental sources of supply have been practically eliminated because of the war. In this connection he says: "There are few in this country who produce a motor vehicle entirely from raw material. Quite 50 per cent. of the material is wholly or partly furnished by firms who specialize in the various lines of manufacture, such as pressed steel frames, radiators, wheels, springs, carbureters, ball bearings, tires, magnetos, bevel and worm gears, etc."

There are many of these parts that the English maker has to secure from abroad, particularly steel castings for truck wheels and other forms of such castings.

Free Research Department

In a very cosmopolitan manner Mr. Pomeroy suggests that a great opportunity presents itself for the English maker to resurrect himself in not a few regards an endeavor to produce on a price basis that will enable him to compete with Germany, Belgium and France. He believes that what is most needed is a committee of scientific experts to consider the question of conducting researches for manufacturers, free of charge, so far as these researches are of general interest and benefit.

Mr. Pomeroy's address in part follows:

The Address

Before considering the broad essentials to economical production, it is well to remember that this country has an enviable reputation for producing high-quality goods of all kinds. It is, in fact, in the position of a tradesman who has built up a business by supplying a first-class article at a moderate price, and in so doing has created a goodwill far too valuable to be thrown away by the emulation of any get-rich-quick methods which are not based upon the intrinsic lasting qualities and general honesty of the article supplied. Great Britain, in spite of foreign claims, is a land of culture, and because of this, demands a certain exclusiveness of product which is against quantity production on anything like the American scale.

To Follow Natural Lines

For this reason the author thinks that the automobile industry must be content to develop upon the natural lines it has followed here since its inception.

Its commercial importance must be based upon a definite superiority of design and execution attained through a constant attitude of healthy discontentedness with things as they are. It is this mental attitude which has maintained certain of our industries, notably steel making and ship building, at a level above competition, and if steadfastly followed out will raise the automobile industry to the same level.

There are in this country few firms, if any, who produce a motor vehicle completely and entirely from raw material. Quite 50 per cent. of the material composing a motor car is supplied wholly or partly finished by firms who specialize in the various lines concerned.

FOR INSTANCE, PRESSED STEEL FRAMES, RADIATORS, WHEELS, SPRINGS, CARBURETERS, BALL BEARINGS, TIRES, MAGNETOS, SPARKING PLUGS, BEVEL AND WORM GEARS, DETAIL FITTINGS SUCH AS INSTRUMENTS, GREASE CUPS, UNIONS, AND IN SOME CASES IMPORTANT UNITS SUCH AS ENGINES, GEAR BOXES, AXLES, ETC., ARE AMONG THE PARTS BOUGHT IN A FINISHED CONDITION READY FOR ASSEMBLING.

The real raw material of the chassis maker is made up of bar steel, stampings, malleable steel, iron, aluminum, bronze and brass castings, tubing, etc. A large part of the trade in the above commodities has been in the hands of Germany and foreign trade rivals, and it is of interest to discuss the principles underlying the successful production of some of the many individual items which are of supreme importance in motor car manufacture. After all, the basis of production is an ample supply of raw material and an ample choice of the sources of such supply. The elimination of Continental sources of supply has brought home to many of us how dependent we were upon them, and, further, how poorly some of our British suppliers compare with those on the Continent. The comparison is still more unfavorable to the British supplier when considered in the light of quality for price.

English Products

To come to articles directly within the compass of the British suppliers, the author would exemplify the following:

Light stampings of alloy and mild steel for parts subject to shock and alternating stress in which correct heat treatment is a sine quâ non.

Heavy stampings, such as back axle casings, front axles, flywheels, crankshafts, brake drums, tapered steel tubes.

Steel castings, particularly road wheels for commercial vehicles, back axle casings and other large castings where very thin sections are desired.

Pressed steel parts, such as brake drums, back axle casings, frames, torque members, step irons, etc.

High-tension steel tubes and thin plates.

Electrical insulating materials suitable for moulded forms, and departing from chassis requirements a little, the author would mention the demand for machine tools for special purposes.

In discussing the difficulties arising from obtaining parts such as those mentioned, the author is speaking from the point of view of a chassis manufacturer, who is anxious to obtain adequate supplies. It is obvious that there will be an influx into the ranks of material suppliers during the next year or two of firms whose previous experience has been outside the automobile industry, and it is to these who are unfamiliar with the very exacting requirements of the said industry that many of these remarks are addressed. To commence with stampings. One of the first difficulties that arises is a financial one, namely, that of payment for dies; this often forms a heavy item of expenditure, which prevents the adoption of stampings, and it would seem a poor policy on the part of stampers to emphasize this charge, as they so often do. Stamping or drop forging is an old industry in this country, but there seems to be room for considerable improvement in the methods of stamping.

There are many stampings which we cannot obtain here. Those members who participated in the official visit to Belgium in the summer cannot fail to have been impressed with the scientific methods of stamping seen there, and, further, the unremitting care with which the product is checked, the elaborate research work which has directed the choice of the material used for various purposes, its heat treatment, and the investigation of its physical and chemical characteristics. The number of firms in Great Britain so equipped is relatively small and usually confined to departments.

Criticize English Stamping

THE CHIEF COMPLAINTS AGAINST BRITISH STAMPERS IS, FIRST, A LACK OF KNOWLEDGE OF THE PHYSICAL CHARACTERISTICS OF THE MATERIAL THEY ARE STAMPING; SECOND, THE TENDENCY TO DISPENSE WITH PRELIMINARY HAND FORGING OF PARTS LIKE CONNECTING RODS, AND TO OVERHEAT THE METAL TO OBTAIN EASY WORKING AND QUICK PRODUCTION; THIRD, A LACK OF APPRECIATION OF HOW CLOSELY TO ITS DESIRED SHAPE A STAMPING CAN BE MADE, AND CONSEQUENT NON-UNIFORMITY OF PRODUCT; AND FOURTH, A COMPLETE DISREGARD, IN ALL BUT A VERY FEW FIRMS, OF THE MANIFEST ADVANTAGES OF HEAT TREATMENT AFTER STAMPING IN ALL CASES, AND ITS ABSOLUTE NECESSITY IN MANY.

Poor Heat Treatment

Last, but far from least, in the general consideration of the desirable qualities of stampings, is that of correct heat treatment. In this connection British firms are deplorably behind those on the Continent. The virtues of heat treatment have been as widely published as any information on a technical subject could be. The enormous increase of resistance to impact and fatigue through it must be known to the stamping trade if only from the demands of automobile manufacturers, and even now very little is done. The stamper will say he *can* heat treat if you require; he will not say that he *will* whether you ask for it or not.

There is a field which has been much less exploited than this and which is equally important, namely, heavy stampings, such as fly wheels, large hubs, back axle casings, and the like. In many cases these are now made as castings, and are, as such, perfectly satisfactory from the designer's point of view. But there are other points of view than that of the designer. The present epoch is that of the automatic machine tool, and for its successful use consistency of material is a *sine quâ non*. Until the makers of castings approach this ideal to a greater degree than they do at present, the qualities of stampings in respect of easy machining and consistency of texture make them an easy first for popularity among works managers whose susceptibility to irritation when an expensive forming tool or special tap is fractured through an occasional hard casting is well known. The large quantities which allow of the successful application of automatic machines are those which justify the expenditure on dies. The fact remains, however, that if all castings could be relied upon for uniformity of softness they would hold the field, first because of the fact that they can be made in intricate forms, secondly that the amount of material to be removed for a given object is usually less. For instance, a hub made as a stamping will weigh twice as much as a corresponding casting, and the difference in weight has to be removed by machining. It does not seem impossible to one who is not an expert in stamping problems to hope that by a suitable series of dies much thinner sections of metal could be stamped than are at present produced.

Need Steel Castings

When the field for the supply of malleable iron and steel castings is surveyed we again become painfully aware of our deficiencies. The modern steel casting is an electric furnace product, and these furnaces were first exploited on the Continent owing to the abundance of cheap electricity, and the solution of the metallurgical problems involved.

IT IS TO-DAY A MATTER OF DIFFICULTY TO OBTAIN STEEL CASTINGS SUITABLE FOR AUTOMOBILE WORK IN THIS COUNTRY, REGARDLESS ALTOGETHER OF PRICE. IN PARTICULAR, STEEL ROAD WHEELS ARE PRACTICALLY UNOBTAINABLE.

The production of a cast wheel in any metal is a matter of difficulty owing to the contraction stresses induced by unequal cooling, and the difficulty is probably greater in casting soft steel than in any other metal. Yet these difficulties have been met and completely overcome abroad with consequent loss of business to this country and its paralysis in this respect at the moment.

The same remarks apply to back axle castings, brake drums, etc.

The author can remember no instance when discussing steel castings that hard things were not said of them. Such firms as make successful steel castings are mainly engaged on very heavy work. It is probably again due to the fact that the automobile has been beneath the notice of our leading works until a year or two ago that more progress has not been made.

THERE IS A BIG HEALTHY MARKET FOR GOOD STEEL CASTINGS THAT SHALL BE SOUND, SOFT AND EASILY MACHINED, THE LAST TWO QUALITIES NOT BEING IDENTICAL.

Again, we are up against the bugbear of minimum thickness. The author has tried to get castings of exhaust manifolds 1-8 inch in thickness and failed. He then put the thickness up to 3-16 inch, and got sound castings; but, unfortunately, upon sawing them up he found the thickness to vary from 3-16 inch to 5-16 inch, mostly the latter. The importance of the subject is more far-reaching than is at first imagined, and the expenditure of a lot of time and money on the production of very thin castings, say down to 3-32 inch thick, would be well rewarded.

Finish of Castings

The external finish of steel castings is also another weak spot. This may not sound important, but it is one of the things that, other things being equal, decide the destination of contracts. Malleable iron certainly scores in this respect. When dealing with steel and malleable castings from the same pattern the two metals are quite easily identified. The chief complaints in regard to malleable castings are occasional hard batches and perpetual delay in delivery. It is necessary to be a prophet to deal with malleable iron successfully. Its physical characteristics are, however, very good. There seems no reason why it should not be a good material for road wheels and compete with steel castings all around.

In considering the possibilities of trade expansion due to the elimination of foreign competition, cylinder castings, ball bearings and electrical apparatus come to mind. The first two are already in a healthy state, and the equals of anything turned out anywhere, but electrical apparatus, insulating material, high tension cable and sparking plugs, to say nothing of the magneto, are all open to criticism.

The author has passed a high-tension current through a piece of red fiber alleged insulating material 18 inches long; he has cut the insulating material off the outside of high-tension cable with more ease than a garden hose could be cut; he has experimented with countless brands of sparking plugs that pre-ignited in less than three minutes in an engine running at 2,000 revolutions per minute, and in his opinion the state of affairs is bad in which such materials can be offered for sale, much less used. The British manufacturer of these articles can gain infinitely by delivering the real goods, and now is the time for him to get going. It is idle to talk of foreign competition when that competition is allowed to become a monopoly.

Research Work Needed

For anything like a systematic series of experiments on the automobile, its efficiency and effectiveness, we have to turn to Germany. Such scientific work as has been done here on engines has only been done by men of undisputed authority in the world of physical science, but out of touch with the industry, working on obsolete engines and obtaining results of about as much practical use as the Technical College tests of its steam engine.

We want information not for its use in teaching students to measure accurately, though that is of first importance, but for the suggestion of improvements and for indicating departures in design that shall place the British industry at the head of the world's automobile producers.

The author would suggest that a committee be formed consisting of scientific experts and practical men to consider the question of conducting researches for manufacturers free of charge, so far as these researches are of general interest and benefit.

Economy in Research

If to it be added a series of experiments co-relating the heat discharge of a radiator with the velocity of cooling water through the tubes and the air velocity past them, we should have data for fixing radiator sizes which would be of great commercial value. From experiments made by the author he is satisfied that a radiator of about one-third the size of that now ordinarily fitted would be capable of properly cooling the engine. But before this can be done with safetv. it is necessary to have experimental data covering all likely conditions in use. An ordinary honeycomb radiator for, say, a 183-cubic inch engine costs roughly $50. If the radiator surface could be halved the price would fall at least 25 per cent. On an output of 1,000 chassis per year this is a saving of $12,500. Yet no one seems to have the resources and enterprise to try and make that saving. The author thinks that this sufficiently illustrates his point that research should be directed towards the saving of money.

Still dealing with matters relating to the engine, the carbureter comes to mind. The claims of carbureter makers are monotonous in their uniformity of suggested perfection. The author feels sure that well-directed research into the effect of varying shapes of induction pipes, of the application of heat at the right spots and of true vaporization would result in the establishment of fundamental data to which carbureter makers could add their various mechanical devices at their own sweet will.

The bearing pressures and speeds of ordinary engineering practice are already exceeded in many gasoline engines, but there is every indication that still further reduction in size is possible, due to the rapidly rotating and reciprocating nature of the load in automobile engines.

Gearbox Research

Turning to the chassis, our opportunities increase. The author is informed on good authority that the Mercedes Grand Prix racer this year used a fourteen-tooth bevel pinion in the rear axle drive. If this can be done in the back axle, it can be done in the gearbox. A fourteen-tooth pinion is usually looked upon as a mechanical compromise owing to interference, unless the involute angle is very steep. But if a fourteen-tooth pinion can be made to run quietly without introducing other ill effects an important practical result follows. In a pleasure car, for instance, the relation between the fourth and the first speed is usually about 4:1, *i.e.*, a car geared to 3:1 on top is usually about 12:1 on first. Using a 14-tooth first reduction pinion the wheel gearing with it would have twenty-eight teeth, and at the other end of the box the ratio would be reversed, giving the 4:1 reduction; this refers to boxes with direct drive on top. If six-pitch teeth be used, this means a shaft center distance of 3 1-2 inches, which is decidedly less than current practice.

Compared with 4 1-2-inch centers, we have a saving in a four-speed box of forty-eight teeth per box, and a consequent considerable saving in weight due to smaller diameter stampings and reduced external dimensions of the whole gear-box. The only point which needs settling is whether a fourteen-tooth pinion can be made to run quietly.

It is an axiom that no design is good which cannot survive a liberal dose of bad workmanship. On this criterion gear-box design is bad indeed. The author knows of no manufacturer who is not troubled with the noise made by gear-boxes, and further, there seems no easy method of obtaining silence combined with durability.

If an engine be considered whose torque is constant up to, say, 5,000 revolutions per minute, and giving, say, 100 horsepower at that speed, driving a rear axle with a gear loss varying as the square of the speed, the available horsepower transmitted to the back axle would be, if the gear loss at 1,000 revolutions per minute were 10 per cent.:

at 1,000 revs.	per	minute	....	20	—	2	=	18
2,000	"	"	....	40	—	8	=	32
3,000	"	"	....	60	—	18	=	42
4,000	"	"	....	80	—	32	=	48
5,000	"	"	....	100	—	50	=	50

These figures are, of course, extremes, and chosen to illustrate the point under discussion. For years automobile engineers have considered an automobile as a machine whose efficiency curve is a straight line. If this is not the case, and there is ample evidence to refute it, there is the important and far-reaching consequence mentioned which may materially affect the trend of design. The few instances chosen to indicate the possibilities of properly directed research work only approach the fringe of the subject.

All this may appear visionary, but it is the means whereby Germany has become the commercial rival she was, and will be again when the disturbance caused by the war has passed away. If Germany can then produce better articles than those made by any other country she will sell them, and if these next few years are allowed to pass without a strenuous effort on the part of our industries to place themselves in a position in which we can compete on equal terms, our opportunity will have been wasted.

From the pure design point of view the commercial vehicle has not yet attained much more than the stage of reasonable reliability, regardless of weight, engine power possibilities and economy. But there are signs that the commercial chassis designers are taking an interest in these latter, and in these directions the pleasure chassis manufacturers' experience should stand in good stead.

The battle for the high efficiency commercial chassis will doubtless follow on the lines of that in the pleasure-car industry, and the author can see no reason why the result should not be the same.

Already many firms are building both commercial and pleasure vehicles, and this policy will probably become more widespread during the immediate future while the industry as a whole is steadying itself. But sooner or later the *status quo ante bellum* will be restored, and it will be interesting to see how the automobile industry has used its opportunity.

Largest Crane Mounted on Peerless Chassis

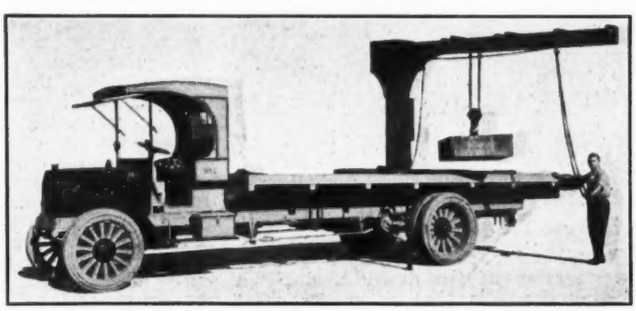
A TRAFFIC problem in the garbage department of the city of Detroit has been met by the use of a special Peerless 6-ton truck equipped with the largest crane that ever has been installed upon a motor truck. This crane will lift 2 1-2 tons onto the truck. Most crane experts have heretofore contended that a 1-ton crane was the largest that any truck could carry.

The garbage of the city of Detroit is carried on open coal cars to the plants of the Detroit Reduction Co. outside of the city. There are only a few substations at which the cars can be loaded for property owners in the vicinity object very strenuously to them and in many cases have forced the abandonment of newly opened stations.

This makes a long haul to the substation unavoidable. It was found impracticable to use motor trucks for the actual collections of garbage because the great frequency of the stops made it require as long a time to load a ton of garbage upon the truck as upon a wagon. Yet when horse wagons were used exclusively the long haul with the empty or fully loaded wagon would often take from two to three hours. The wagons in many cases were able to make only one trip a day.

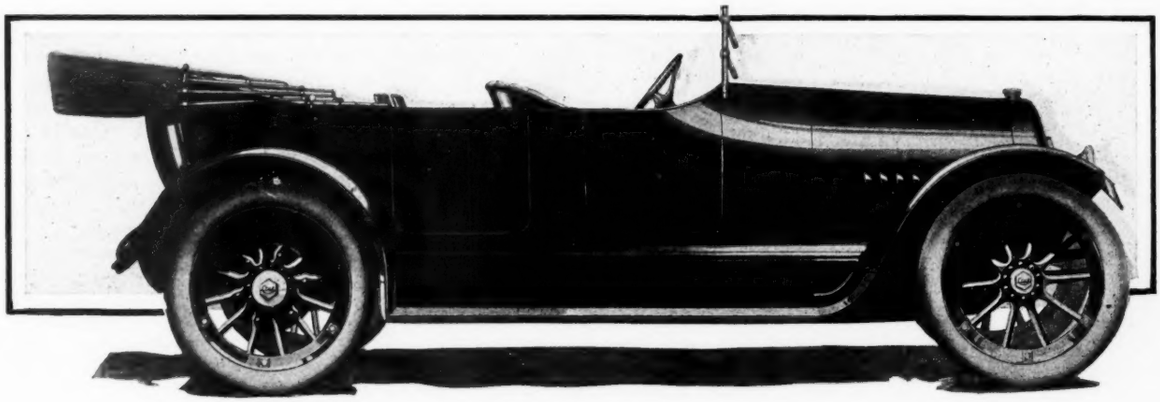
Jack Knight, superintendent of the Garbage and Street Cleaning Department solved this problem by the purchase of the special Peerless 6-ton truck. Garbage wagons from the different sections of the city are met on the way to the substation and their 2-ton loads are lifted off onto the truck by the crane. An empty box is hoisted from the truck to the wagon to be refilled. One wagon now collects two loads in the time that was formerly required to collect one.

In the case of the breakdown of a garbage wagon on the streets the truck picks up the load and removes it at once avoiding the very undesirable condition created when it has to be shoveled from one wagon to another.



6-ton Peerless truck fitted with crane for Detroit Garbage Department

New Four-Cylinder Cole for $1,485



Four-cylinder Cole touring car listing at $1,485 with 29-horsepower motor and streamline body

A FOUR-CYLINDER Cole listing at $1,485, or nearly $200 less than any previous four-cylinder made by the Cole Motor Car Co., Indianapolis, Ind., is one more example of the greater attention that is being given to fours of a medium size for next season.

This model uses the Northway unit motor, clutch and gearbox, the motor having cylinders 4.25 by 5.25 with an A. L. A. M. rating of 29 horsepower and a piston displacement of 297.8 cubic inches. The chassis with a 120-inch wheelbase carries a seven-passenger body with complete equipment including Delco lighting, starting and ignition system, Stewart vacuum-gravity gasoline feed, Stromberg carbureter with hot air connection to a jacket on the manifold, motor-driven tire pump, electric horn, speedometer set flush in instrument board, automatic, full-ventilating rain-vision windshield, and other features such as quickly-detachable top curtains, etc. Helical gears are used in the Timken rear axle and Firestone demountable rims are regular equipment.

Averaged Over 24 Miles per Gallon

This is the car that in a recent official test under A. A. A. sanction at the Indianapolis speedway traveled over 24 1-8 miles to a gallon of gasoline with the car carrying full equipment and seven passengers. It showed 53 miles per ton of weight on a gallon of gasoline, which is equivalent to carrying 1 ton of weight 53 miles on 1 gallon of gasoline.

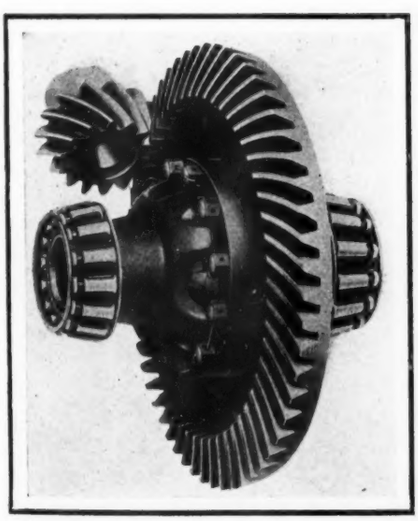
Besides this without any adjustments it showed consistent running for a half-hour non-stop test at a fixed speed of 55.63 miles per hour.

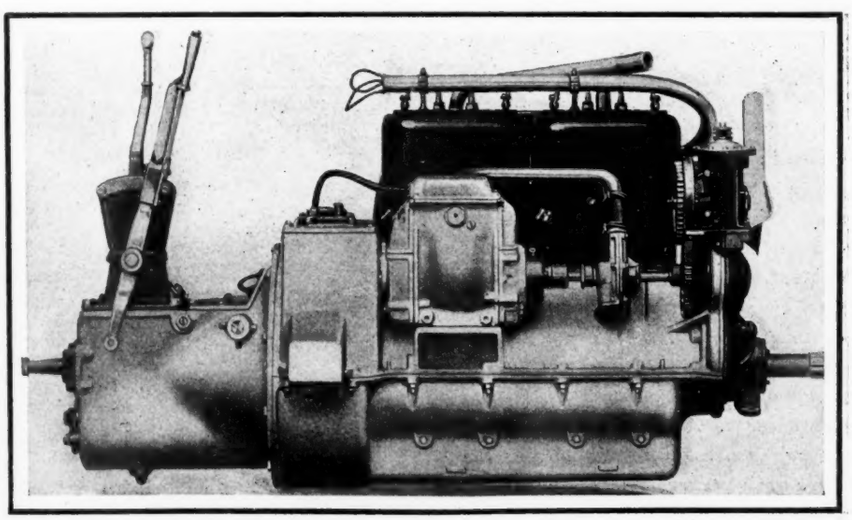
Streamline Body—Folding Auxiliary Seats

The body is a stream-line design, having neither rise nor drop in the cowl. The radiator, hood and body are blended into one another by having all the lines of the radiator diverged into the body. The front seats are of the individual type with a 7.5-inch aisle between. There are four doors, all operative, and exceptionally wide, 22 inches in front and 24 inches in tonneau. Folding auxiliary seats with disappearing irons are regular equipment.

With the aisleway between the front seats the operation of raising or lowering the one-man top is simple. Drop forged steel standards for carrying the one-man top are used. The top is manufactured throughout to be right when up.

A leather-faced cone clutch forms the connecting link between the motor and the gearset. The aluminum cone is





Left—Spiral bevel drive used in new four-cylinder Cole. Right—Northway unit power plant employed, showing mounting of Delco electrical system

14 7-8 inches in diameter and 2 1-2 inches wide, with an 11-degree face angle. The clutch hub bearing is of the annular ball type, and a ball thrust bearing is provided for the throw-out mechanism. Six coiled springs hold the clutch in engagement. A brake is provided on the clutch.

The shafts of the transmission are made of chrome-nickel steel, and are mounted on annular ball bearings. A roller bearing is used where the sliding gearshaft floats in the clutch shaft extension. The gears are all of .75-inch face; forged from chrome-nickel steel. Both the main shaft and jackshaft are 1 1-2 inches in diameter. The jackshaft is only 6 5-8 inches long between bearings.

A Spicer universal joint is used at each end of the drive shaft which is 1 3-8 inches in diameter. The rear axle is Timken with helical pinion drive. The gears and shaft are forgings of chrome-nickel steel. The driving gears are of 4 1-2 pitch, with stub teeth, and have 1 3-8-inch face. The driving pinion is supported by two roller bearings on a 1 1-2-inch shaft. The pinion shaft is of chrome-nickel steel. The drive shafts have six-jawed clutches on their outer ends which mesh with jaws in the steel hubs.

The internal and external brake drums are 15 1-2 inches in diameter by 2 1-2 inches wide and are faced with autobestine, an asbestos fabric.

The semi-elliptic front springs are 37 1-4 inches long, 2 inches wide, and the spring's eyes are bushed with phosphor bronze. The three-quarter rears, 50 1-4 inches long. Firestone demountable rims are fitted as standard equipment.

The Gemmer steering gear is mounted on the left side, and an 18-inch corrugated wheel is used. The steering gear itself is the worm-and-full-gear type.

The double drop frame, which has a section 4 1-6 inches high is extended to the rear of the body to form a support for the gasoline tank. The 7 1-4-inch kick-up in the frame over the rear axle allows a wide spring action.

Besides this model the company continues its six at $1,865 and a big six at $2,465.

To Re-Open Van Dyke Bankruptcy Case

DETROIT, MICH., Oct. 27—The bankruptcy case of the Van Dyke Motor Car Co., which was closed in December, 1912, will be re-opened, permission having been granted by Judge Tuttle, of the United States Circuit Court. The Columbus Bolt Works, Columbus, one of the creditors, petitioned the court, claiming that about 200 stockholders or other persons which had subscribed for stock in the Van Dyke company never paid in their capital stock, which, it is claimed, represents a sum of about $200,000. The court now decided to re-open the case upon seeing the list submitted by the Columbus Bolt Works and which shows that the stock was sold at from $6.66 to $9.00 a share although the par value had been set at $10 a share in the articles of association. The Columbus company claims that the stockholders should be compelled to pay the amounts above those actually paid for the stock, also the amounts subscribed but not paid in, as these sums constitute a part of the estate and as such should be distributed among the creditors.

New Cowles Patent on Motor Support

WASHINGTON, D. C., Oct. 23—Another Cowles patent of seeming importance in that it covers the flexible support of the motor to a cross-frame member has been issued and assigned to the Packard Motor Car Co. This patent, which is No. 1,112,678, was applied for by Edward P. Cowles of Sparta, Mich., September 6, 1901. It has as its object a flexible connection of the motor to the frame and has five claims. Claims 4 and 5 are particularly noticeable as they specify two rigid and one flexible supports of the motor to the frame. They read as follows.

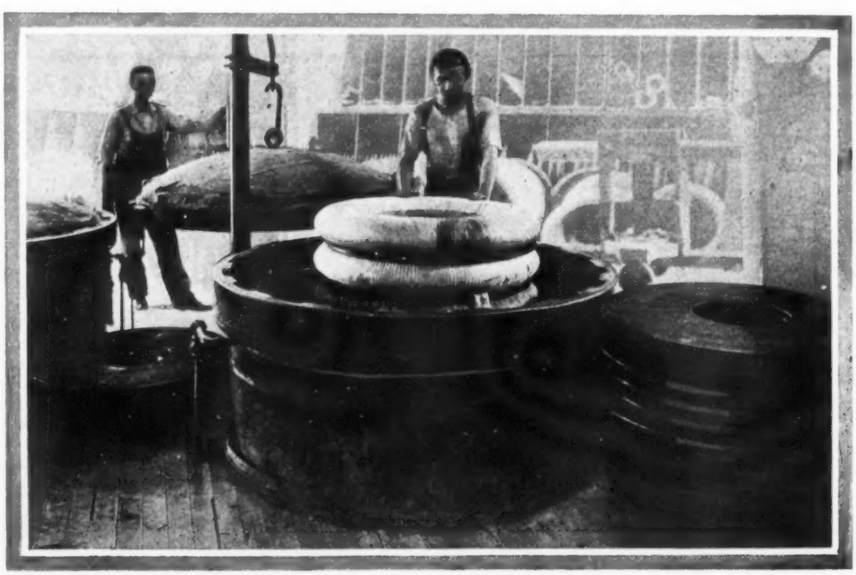
Two Important Claims

4.—In a motor vehicle, the combination of a motor supporting frame comprising sidebars, a crossbar connected to said frame, a motor, supporting arms or brackets, extending laterally from the motor, means connecting said arms to said frames, and means connecting said motor to said crossbar, one of said means being flexible and permitting relative movement of the motor and adjacent parts of the frame and the other of said means being rigid and tending to limit the extent of said movements.

5.—In a motor vehicle, the combination of a motor supporting frame comprising sidebars, a motor having laterally extended supporting arms or brackets, means connecting said arms to said sidebars whereby the motor is supported thereon, a crossbar adjacent one end of said motor and connected at both ends to said frame, and means connecting said motor to said crossbar at the middle portion of the crossbar.

Curing Newly-Made Tires in Federal Plant

¶ *The process of curing, so often referred to by the rubber experts, is clearly shown in the accompanying illustration taken at the Milwaukee plant of the Federal Rubber Mfg. Co. About a dozen newly made tires, tightly wrapped in canvas tape, and compressed under hydraulic power into steel cases, are placed in one compartment. The lid fits closely over the vat, so as to keep it airtight, and live steam is shot into the space around the tires. The steam softens the tires until they conform to the shape of the steel molds in which they are encased. After three and a half hours' immersion in the steam, the tires are taken out, cooled, and wrapped for shipment to the purchaser or dealer.*



Curing tires at the plant of the Federal Rubber Mfg. Co., Milwaukee, Wis.

Branch Banks for South America

To Secure Credit Information, Aid Manufacturers and Exporters, Etc.—Patient Effort Will Develop Opportunity

ONE of the most interesting addresses made at the meeting called by the Merchants' Association at the Hotel Astor, New York City, recently for the purpose of discussing South American trade was that by William F. Kies,* head of the foreign trade department of the National City Bank. Following is a brief digest of his paper:

Credit Information Needed

"A detriment to the development of foreign trade everywhere and in South America particularly, has been the lack of reliable credit information. It may be very easy to sell goods but it is sometimes more difficult to get your pay for them. Credit is vitally necessary to the growth of trade. No business man objects to giving credit if he knows his creditor is honest and will pay him when the bill is due. Banks are more and more relied upon to furnish opinions as to the financial responsibility of business firms. It is, of course, of particular importance when your goods are to be shipped thousands of miles away to know that the man to whom you are consigning them is worthy of credit. Probably Latin-American countries are the most difficult in which to obtain credit information. The Latin-American is sensitive and with him usually credit is a point of honor. He resents inquiry for the examination of his books and rarely gives a statement. The collection of credit information, therefore, in South American countries will require the exercise of diplomacy and tact.

The compilation of complete credit files will necessarily take a long time. Capable credit men have been sent to Buenos Aires and the work of collecting credit information will be begun at once. As fast as credit files are compiled, duplicates will be sent to this country so that information concerning the standing of Argentine merchants will be available here without the necessary delay. Special credit investigations can be made whenever needed. The credit bureau is being built up for the benefit of American exporters and importers, and the information which will be collected may be had upon request.

Personal Touch Important

As the field was studied it was seen that a trained commercial representative, devoting his entire time to the promotion of American interests might do invaluable work in the upbuilding of our South American trade. Such a man would provide the personal representation so much needed. It has been arranged to have such a commercial man to make it with each branch. His duty will be to study closely local markets in an endeavor to develop trade opportunities for American merchants. He will form a close personal acquaintance with local business men and in Spanish speaking countries the value of a personal acquaintance cannot be over-estimated. He will endeavor to interest local merchants in American goods. Whenever a real trade opportunity arises he will cable to New York and the various lines interested will be notified by special letter. He will be in a position to make special investigation for firms desirous of ascertaining whether a market exists for their product. He will be able to ascertain the style and character of the goods in demand in the market, how they are packed, the price at which sold and all facts necessary to enable the manufacturer here to determine the possibility of his being able to compete in the market.

In order that the general information may be properly disseminated there will be issued from time to time a publication to be known as *The Americas* devoted to the upbuilding of trade between the two countries. Trade bulletins and letters will also be used in keeping our people informed of trade opportunities and financial and economic conditions in South America.

Present Conditions Favorable

Present conditions are favorable for the ultimate commercial success of this country in South America; but we must not enter into this big trade movement with the idea of getting immediate large results. Argentine and Brazil have been through a long period of depression. Brazil owing to the failure of the negotiations for her $100,000,000 loan with English interests is in financial straits. The value of the milreis, the monetary standard, has depreciated 20 per cent. and there will be great difficulty in the marketing of the large coffee crop while the market for her tobacco is closed.

Argentina for the present and immediate future has probably the best prospects of any South American country. A picture of her immediate financial prospects and her possible purchasing power may be drawn from the following statistical review just received by cable:

Of the total corn crop there still remain 110,230,000 bushels unsold. Present price, 52 cents per bushel.

The estimated surplus of wheat over domestic requirements is placed at 24,046,000 bushels, with the market price $1.16 per bushel.

There still remain 6,613,800 bushels of linseed for export, the market price being $1.19.

The entire old crop of wool has been disposed of and the shearing of the new crop begun. A normal crop of 310,000 weighing 880 pounds is expected which, at the average price of 19 1-3 cents per pound, would bring $52,650,400.

The price of cattle to producers has increased in the past few months from $46.80 to $76.57 per head, production for the present year being estimated at 1,500,000 head. The entire output will be marketed advantageously. The hide market is stagnant at the present time with a quantity of hides accumulating in the interior. The quantity this year for export is about $3,000,000.

The growing crops so far as reported are in good condition. The immediate prospects for Argentina are therefore good and she should recover more rapidly than any other South American nation from the effects of the European war.

Other South American countries will have difficulty in marketing their products. Chile's nitrate, like our cotton, presents a serious problem. Likewise the copper of Peru and the tin of Bolivia. But the ultimate prosperity of all these countries is not in doubt. Their natural resources are almost inexhaustible, and they will have to be a source of supply for raw materials of all kinds.

Patient Effort Required

While the situation at present is filled with difficulties and conditions at the very moment seem unpropitious, nevertheless it would seem the commercial interests of this country are confronted with a great opportunity.

*EDITOR'S NOTE—The National City Bank, of which Mr. Kies is the head of the Foreign Trade Department, has set aside $1,000,000 for the establishment of a branch at Buenos Aires and also at Rio de Janeiro, the Federal Reserve Board having authorized their establishment. The staff for the Buenos Aires branch has been selected and is on its way. The branch will be in operation early next month. The staff for Rio de Janeiro is nearly organized and the branch will be in operation before the first of the year. The operations of these branches are expected to make New York the money market for South America, at least to the extent that American bills shall be paid in dollars on New York and not in pounds sterling on London.

ABILITY to wear is the criterion that many foreigners use in the selection of a motor truck. Will it wear? This is the question they endeavor to solve. Parts must wear, and have they provision for adjustment? Can you adjust the bushings of the steering gear when they wear? It is cheaper to adjust than to replace. It is much quicker and in either war or industry the economy of time is a vital factor in truck operation.

So adjustment and accessibility become real factors in truck work. So Europe considers it, and as Europe is the big buyer today, it is quite necessary that these matters be conspicuous. But adjustability and accessibility are not important solely because Europe thinks so. Our own conditions demand them. Our industries demand such; and should our nation make large purchases of trucks for war purposes or determine on some form of truck subsidy system these factors would be equally important.—Editorial in THE AUTOMOBILE, *October* 8, 1914.

WEAR

The Necessity for Balance Among Wearing Parts in Cars and Trucks

The Real Strength of Truck Is That of Weakest Part

By John W. Watson

Member Society Automobile Engineers, President of the American Bronze Co.

BERWYN, PA.—Editor THE AUTOMOBILE:—The problem of every man or concern operating motor vehicles, whether for the delivery of goods or for the transportation of passengers, is to keep these vehicles on the road where they earn money and out of the shop where they cost money.

To have a fleet of six trucks or six taxicabs and average but five of them on the road and one of them in the shop is certainly not very encouraging to the man having invested his money in these six vehicles for business purposes.

The One Evil

Why is it that these cars must be laid up for overhauling? The answer is found in the one big word wear. If there was never any wear there would be mighty few interruptions to continuous service. The occasional breaking of some part would be all that could then interrupt service and entail expense.

Wear, though, we will always have. Between any two moving parts there is always friction and friction causes wear to a degree dependent upon the quality of the metals in contact with one another.

Where Found

The bulk of parts in the makeup of any motor vehicle are in no way subjected to wear, there being no movement between these parts and the parts to which they are bolted. Let us analyze and see what parts *are* subjected to wear in motor vehicles. As the writer analyzes a motor vehicle its wear-subjected parts may be classified under four headings. Gears, Ball and Roller Bearings, Plain Bearings (split and therefore adjustable for wear), Bushings (solid and therefore non-adjustable for wear).

Let us now analyze a little further and see how these wear-subjected parts balance up with one another. If they all lasted for the same length of time, the car would not have to be laid up for an overhauling until all of these parts were down and out. This would be a long time indeed and any such car would prove a wonderfully profitable investment.

It so happens, though, that these four classes of wear-subjected parts, in many cars at least, come *nowhere near* balancing one another in length of service given. Let us separately analyze the wear-resisting qualities and the average life of the parts under each of these headings.

First let us take up the gears. There are motor gears, pump gears, steering gears, transmission gears, bevel gears, differential gears, etc. Present day science in the alloying of steels and in the heat treatment of steels combined with present day accuracy in the cutting of gear teeth renders these gear parts practically immune from wear. And even after years of servie when the gear teeth may have shown a little wear, there is no lost motion between the driving and the driven gear so long as the power is on. When the power is on, the gear teeth are just as snugly up against one another after wear has taken place as they are when the gears were new. If gears were the only parts which necessitated the overhauling of a car there would be few cars indeed requiring overhauling.

Bearing Wear Small

Now let us take up the ball and roller bearings. These bearings, because of the very fact that they run with so little friction and therefore show so little wear, are used in motor cars wherever construction will permit. The reason ball and roller bearings run with so little friction and show so little wear is because this type of bearing gives a rolling and not a sliding action. Present day ball and roller bearings give such long

and satisfactory service that the average car owner never even finds out where they are located. Breakage, due to a defective ball, a defective roller or a defective race is practically the only circumstance which will send a car to the shop for the renewal of these parts. And defects in ball and roller bearings in these days are rare indeed.

Bushings That Wear

Now we come to the heading of split, and therefore adjustable, plain bearings. These plain split bearings, in most cars of present design, are found only on the main motor crankshaft. There are the three or more main crankshaft bearings and the four or six crankpin bearings. These bearings after a year or 2 of service show wear, but by simply dropping the oil case under the motor and removing a shim or two between the two halves of the worn bearings this wear is quickly taken up and the bearings are then ready to give another year or 2 of perfect service. This work does not involve the dismantling of any of the other parts of the car and is done at very little cost in a very short time by any average mechanic. It takes many years of hard service to wear these bearings down to the point where their renewal is made necessary.

Non-Adjustable Bushings

Now we come to the last of the four headings of wear-subjected parts. This heading covers the solid non-adjustable bushings. These bushings are found here, there and everywhere, throughout the whole car. There are the wristpin bushings, camshaft bushings, magneto and pump shaft bushings, idler gear bushings, oil pump bushings, valve plunger guides, steering gear bushings, front axle steering knuckle bushings, clutch bushings, two or three bushings in the transmission, universal joint bushings, differential pinion bushings, etc.

When new, these bushings are purposely fitted snugly to their respective shafts. These bushings *must* be snug in order to hold these shafts in their correct alignment. We have a sliding and not a rolling contact in these bushings and we therefore have friction and this friction means wear. We have the same kind of friction that we have on the main crankshaft bearings, but these bushings, unlike the main crankshaft bearings, are not split and wear on them therefore can in no way be taken up. When the bushings have worn down even as little as 2 or 3 thousandths inch, less than the thickness of this page, their period of usefulness is over and their renewal is demanded.

These solid non-adjustable bushings therefore are the parts which are sadly out of balance with the other three classes of wear-subjected parts. All of the other parts are still giving perfect service and are therefore just as good as new, and yet the car must be taken out of service, put in the shop and torn to pieces for the renewal of those bushings which have worn to the point where their renewal is demanded.

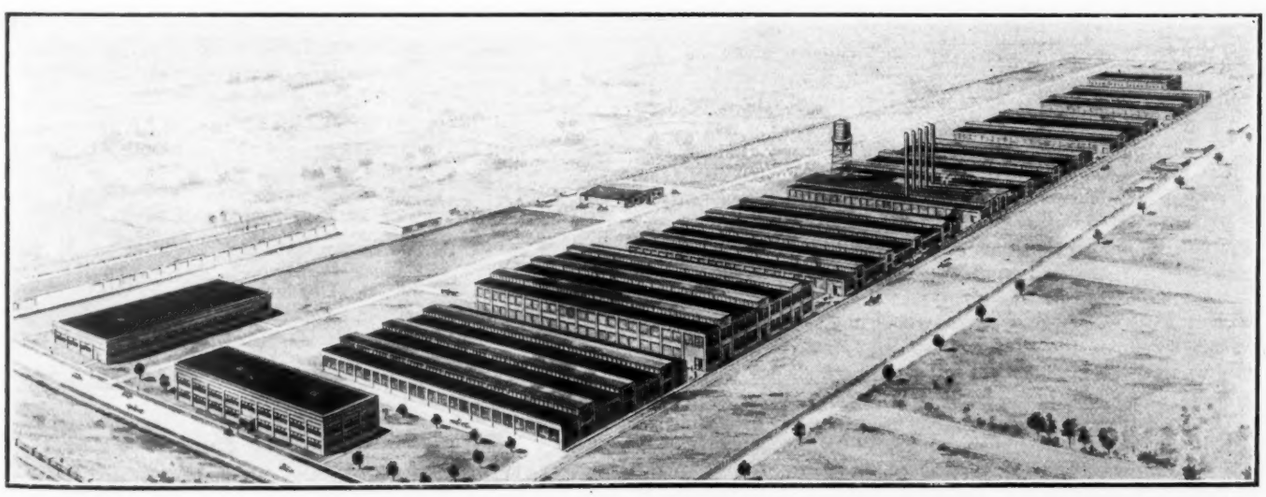
And it isn't as if all of the solid bushings wore down to this point at the same time and thus make it possible to renew them all at one tearing down. It often happens, because of lack of uniformity in bushing materials, that even bushings subjected to the same duty will not give the same length of service. In hundreds and hundreds of cases it happens that one piston pin bushing will be worn to the point of producing a bad knock before the other three piston pin bushings have shown any wear at all. And it takes just as much time and costs practically the same amount of money to renew this one bushing as it would to renew all four of them. To renew any one or more of these solid non-adjustable bushings generally means the dismantling of some entire unit—the motor, the gearset, the rear axle or some one of the several other units.

How important it is then that bushing material should be right and should be uniformly right. Inferior bushings will spell disaster to the otherwise finest of motor vehicles and superior bushings will make balanced and economical service givers out of otherwise medium grade vehicles.

The Maker's Duty

In view of the foregoing analysis as to what groups of parts are subjected to wear and then as to which of these groups will logically show first wear and require first renewal, it is clearly seen wherein lies a manufacturer's open road to vastly lessen the up-keep cost of his cars and to thus greatly increase their value. And purchasers of motor vehicles are wise who insist upon learning all that is to be learned about materials for these bushing duties and about the bushing materials which are used in the various makes of cars which are being demonstrated to them.

It is important that a car demonstrate its ability to carry the load and negotiate the hill, but it is also vastly important that the car will *continue* to carry the load and negotiate the hill. In the manufacture or purchase of a commercial vehicle it is well to always keep in mind that the value of this vehicle lies in its being on the road where it earns money and out of the shop where it costs money.—JOHN W. WATSON, President, American Bronze Co.



¶ The new plant of the Willard Storage Battery Co., Cleveland, O., when completed, will contain 6 acres of floorspace, leaving ample land for further expansion. Ten buildings will comprise the plant. All buildings will be of brick, of the latest approved and most up-to-date construction and equipped with sprinkler system throughout. The various buildings will be entirely separate, sufficiently isolated from each other to insure adequate protection from fire, and to furnish the maximum of light and air. The plant was described in THE AUTOMOBILE for October 22. Both factories, the old one at present occupied, and portions of the new plant as fast as completed, will be operated in conjunction, to afford ample production facilities for the heavy business of the early months of 1915.

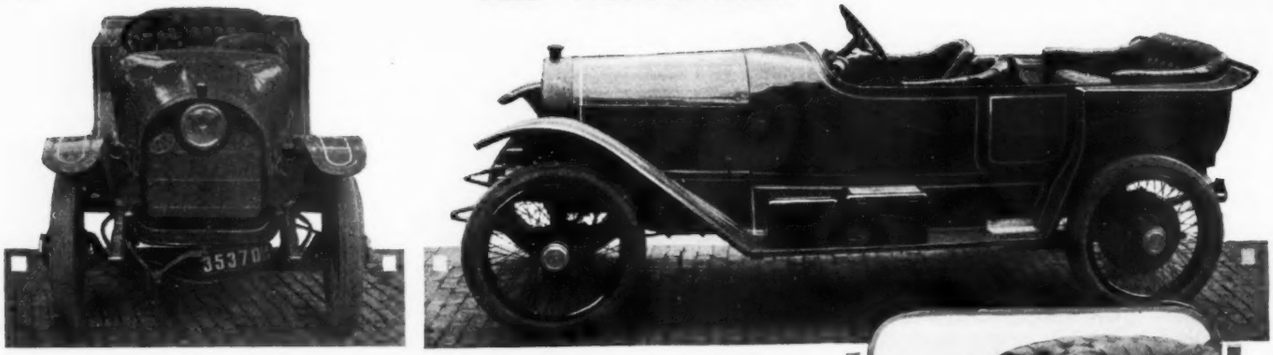


Fig. 1—Three views of car built by Iowa man. The motor has a bore of 5⅛ inches

The Rostrum

Claims Owner's Statements of Yearly Mileage Are Generally Exaggerated

EDITOR THE AUTOMOBILE:—What is the maximum mileage per year for a private machine? That question and discussions arising from it have been of singular interest to me for the greater part of the 14 years I have been associated with automobiles.

The talk one hears in garages, factories, repair shops, etc., leads the novice to have as little respect for 10,000 or 20,000 miles, as he should have for 1,000.

Fifteen to 20,000 miles in the 3 or 4 summer months is a common boast of the majority of tourists you meet, and it is very, very seldom that I find a man that really has any idea of how far a car can actually travel in a series of consecutive days, driven constantly.

A short time ago a certain manufacturer of high-grade cars issued a guaranteed statement that five of his machines had in 5 years traveled an *average* of 200,000 miles *per car*, or 40,000 miles per year per car for 5 consecutive years! And I suppose a large number of people read and believed this statement. As a matter of fact such a performance is an absolute physical impossibility, it simply could not have been accomplished. Let us consider for a moment what the above figures would mean. In the localities given by the manufacturer in question the year around weather is about that of the suburbs of New York City, if anything a little more severe.

Now if a man used his car *every day that he could* and allowed 2 weeks, stretched out throughout the 52 weeks of each year for overhauling and painting, a most conservative time, if the car is on the jump continually, we find that the weather would permit him on, an average to run 300 days each year. This means that EVERY DAY he must run 133 1-3 miles, not letting up ONE DAY HE CAN OPERATE in 5 years. If he does not go out one rainy day he must do 266 2-3 miles the next, and so on. Just reason it out a minute or two and one will see how absurd such a statement is.

The man that says he does 15,000 or so miles in 3 months is just that much more off on his reckoning.

For the fellow who has just bought a car or who is going to buy one, or has driven for some time and wonders about the great mileage others make, it may be of interest to know that the actual mileage of an automobile, driven by a chauffeur, and given hard usage, is very seldom over 9,000 to 10,000 miles a year, whereas a privately driven car does well if it makes 6,000 to 7,000 miles in the same time. Actual average of all cars is just under 4,000 miles a year.

The above figures are arrived at after observing hundreds of cars, in many localities, and owned by people of widely different habits, for several years past.

Don't let anyone be discouraged because he cannot really make a 40,000-mile-a-year average as Smith does, because he does not.

It will really be of benefit to the automobile industry when we all learn just what 10,000 hard fought miles over our highways really means. Car mileage per year per car is an abused topic.

New Rochelle, N. Y. GEORGE C. CANNON.

Unique Car Built by Iowan

Editor THE AUTOMOBILE:—The car pictured shown in Fig. 1 was built by Hal R. Wells of Des Moines, director of the River-to-River Road and holder of the cross-Iowa speed record which he made last November in a Spaulding car. The mechanical features follow the lines of the best practice, the motor being a four-cylinder, L type, 5 1-8-inch bore. The Hele-Shaw clutch, Warner transmission of four speeds forward, and the Timken axles are used. The unique features are in the general lines of the car, the greatest width being in the center of the car and the streamlines are following out in the construction of the rear as well as the front. The width is taken care of by an 8-inch space between the two front seats, the entrance being made through two doors centrally located. Another distinguishing feature is in the arrangement of the lights. The headlight is in the center of the radiator giving the appearance of a modern Cyclops and the sidelights are a part of the inside guard for the front fenders. No lights project from any part of the car.

Des Moines. B. N. MILLS.

How Flywheels Are Fastened

Editor THE AUTOMOBILE:—1—What is the best way to fasten a flywheel permanently, which has become loose on the shaft?

2—I am using battery ignition, for a single-cylinder Cadillac, consisting of eight dry cells and a Splitdorf spark coil.

The contact points in the vibrator cause trouble. They seem to fuse and leave the contact surface so uneven that it will make the motor miss. By smoothing the points every other day there is no trouble, but this constant filing wears out the points in a short while. Is there any cause for this trouble that can be remedied?

Christine, N. D. LEWIS U. IVERSON, M.D.

—1—From your second question we take it that the loose flywheel is on a single-cylinder Cadillac. If this is so the only remedy is a new crankshaft because the flywheel on this model is attached to the crankshaft simply by pressing it in place.

This construction is unusual, as the flywheel is ordinarily fastened to the crankshaft either by keying, or bolting it to a flange on the crankshaft. In the former case the loose flywheel may be tightened by forcing the key solidly in place and then drawing up on the nut that bears against the flywheel hub. If the keyway is worn it may be necessary to make a new one slightly larger and fit a larger key.

If the flywheel is bolted to a flange, all that there is to do is to tighten the bolts. The latter method of fastening is probably best.

2—You should not use more than six cells with this coil. The trouble that you are having with the vibrator points is undoubtedly due to using eight cells, this number of cells gives too great a voltage and causes an excessive flow of current which fuses the points. There is also a danger of burning out the coil.

Bus Bodies Made by Body Makers

Editor THE AUTOMOBILE:—Can you give us the address of some one who manufactures a hotel bus which carries from eight to ten passengers? Give name of a manufacturer who makes the chassis and one who makes the body?

Salisbury, N. C. H. A. R.

—Any manufacturer of truck bodies should be able to make a suitable body for you. We know of no concern that makes a specialty of this work. You can buy a chassis to meet your requirements and then have a body built on to it according to your own ideas.

A few concerns making truck bodies are:

Borbein Auto Co., 2109 N. Ninth street, St. Louis, Mo.
Highland Body Mfg. Co., Elmwood place, Cincinnati, O.
Peters Wagon & Auto Works, Baltimore, Md.
Collins Vehicle Woodwork Co., 3900 Chouteau avenue, St. Louis, Mo.
Cooling Carriage Co., 402 French street, Wilmington, Del.

Description of Piping on Cadillac Eight

Editor THE AUTOMOBILE:—Will you please explain and show by diagram, if possible, how the piping is arranged on the eight-cylinder Cadillac? It would seem to me that there would be some difficulty in arranging the different pipes so that they do not interfere with each other.

Norwalk, Conn. E. J. V.

—A diagram of the piping is shown in a simple manner in Fig. 2. The intake piping is short and simple, the carbureter being placed directly between the cylinder blocks and short pipes from it connecting with each set of four cylinders. Two separate exhaust pipes are used so that there will be no danger of interference. The water piping is also very simple and direct. There is a separate pump for each cylinder block, as shown, and the inlet and outlet connections to and from the radiator are short pieces of hose. Gasoline piping is standard, the tank being located at the rear of the chassis and the fuel being forced to the carbureter through air pressure supplied by a small pump.

Origin of the Word Automobile

Editor THE AUTOMOBILE:—We have been unable to ascertain after considerable inquiry the original cause for the use of the word automobile, and how it originally became connected with the vehicle we know by that name today. Can you tell us?

Memphis, Tenn. THOS. H. SMART.

1—The word Automobile comes from two words; one Greek and the other Latin. The two words are auto and mobile. The former is derived from the Greek autos, meaning self and the latter from the Latin mobilis, adverb, movable. This is originally derived from the Latin verb, moveo, movero, movi, motus, meaning to move. We are unable to say who first suggested this word as the name for self-propelled vehicles.

High-Compression Motor More Powerful

Editor THE AUTOMOBILE:—1—What is the difference between a low and high compression engine?

2—How can I change a low-compression motor to a high compression one?

Canton, N. Y. A. W. E.

—1—The terms low and high used in this sense are, of course, purely relative. A motor with 40 pounds compression might, however, represent one limit and one with 100 pounds the other limit. Fifty to 60 pounds compression is the average.

The low-compression motor gives smooth running, it is easy to crank and the stresses in it are not large, but it is not so economical nor so powerful as the high compression design. The latter is more liable to overheat and to knock.

2—The compression may be raised by several methods. It is hardly advisable to make this change because your motor has been designed for a certain compression and if you raise it, say 10 pounds, you will submit the cylinders to a greater strain than they were designed for; the pressures on the cylinder walls will be greater and the wear on the bearings more. If your motor is not giving the power you should find out what is the matter with it rather than raise the compression.

Probably the best method is to rivet a plate to the top of

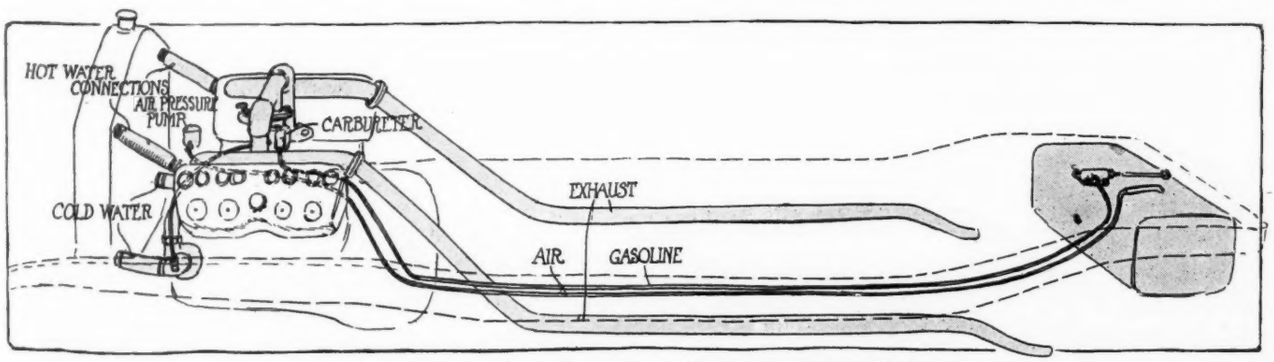


Fig. 2—Diagram showing the piping on the Cadillac eight-cylinder car

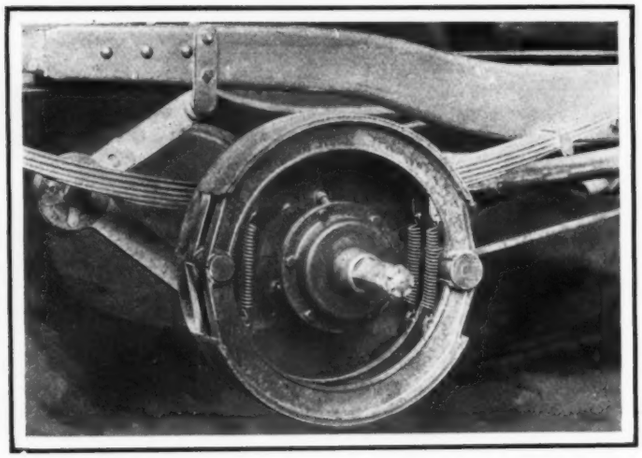


Fig. 3—Illustration showing the construction of dual expanding brakes

the piston or the cylinder, whichever is more convenient. Placing the plate on the piston adds weight to the reciprocating masses while if it is attached to the cylinder head there is danger of interference with the flow of the gases in and out. In either case, be sure that there is clearance enough between the piston and the cylinder to allow the plate to be put into place. If the plate is attached to the piston it should be made of aluminum for the sake of lightness.

Lengthening the connecting-rods or increasing the crankshaft throws will also increase the compression. But neither of these methods are as simple or as cheap as the first one suggested.

Motor Vibration Reduced by Weighing Parts

Editor THE AUTOMOBILE:—I am planning to overhaul my car this winter and as it vibrates greatly at speeds above 20 miles per hour I would like to know if there is any way of reducing it?

Elyria, O. SUBSCRIBER.

—This is largely a question of bringing the reciprocating parts to the same weight. Remove the pistons and the connecting-rods. Weigh all the pistons with the wristpins, and remove metal from the heavier ones until they are all exactly the same weight. Do the same with the connecting-rods.

Advantages of Dual Expanding Brakes

Editor THE AUTOMOBILE:—I note that some cars have both sets of brakes placed inside the rear wheel drums, and that both sets are expanding instead of having contracting bands on the outside and expanding bands on the inside. Will you please illustrate this construction and explain its advantages?

Norfolk, Va. J. A. BARNES.

—Fig. 3 shows how the double expanding brake construction is applied to the Stutz. The two sets are identical and both are operated by cams. The main advantage of this construction is that both sets of brakes are protected from dust, dirt, mud and oil.

Missing Caused by Cold or Dirt

Editor THE AUTOMOBILE:—Can you please tell me what the trouble is with an R. C. H. car which acts as follows: It will run perfectly for a mile or longer, then go badly. Going up grades, or fast on the level, it acts worst. It will either backfire, skip or choke up, with the carbureter adjusted the best that any of the automobile experts here can do. It has a new Model B Stromberg carbureter, new Never-leak rings and new plugs, also new points on the timer. The motor will run until it gets so bad that it will die with the clutch out. Then if I get out and crank the machine, it will go perfectly until speeded up or long grade is made. It acted about the same with the old carbureter. When it is working right it has good power.

Lowville, N. Y. CHAS. A. RUMBLE.

—There are two possibilities. If you have no hot air attachment on this carbureter, the poor running may be due to condensation of the fuel in the intake pipe. If this is so you should buy a hot air connection. It is a simple matter to install it.

It may also be that there is dirt in the fuel line. When this dirt gets under the float valve it causes flooding of the carbureter and missing, and may stop the motor, and at other times some of the dirt may obstruct the passage of the fuel in the pipe or up through the spray nozzle, giving a weak mixture and producing back fires.

Steel Disk Clutch Coefficient .07

Editor THE AUTOMOBILE:—1—What is the coefficient of friction between the polished steel disks of a well-lubricated multiple-disk clutch? I have accepted same to be 0.036.

2—Does the experience gained from automobile clutches verify this figure?

Waynesboro, Pa. G. A. ANDERSON, M. E.

—1—The coefficient of friction depends on the conditions of the surfaces, the viscosity of the lubricant and the pressure between the disks and therefore it is difficult to give a figure for the coefficient or friction. Probably .07 is a good average value, however.

2—The coefficient of .036 might be found to obtain in certain cases.

Spaulding Car Has Bed

Editor THE AUTOMOBILE:—Will you please advise me if you know of any automobile that is made with the backs of the front seats adjustable so they can be laid back flat. The idea would be to have the seats laid back and make a place to sleep. A man told me he had a car of this kind, but whether it was made to order or purchased from stock, I do not know.

Garyville, La. C. M. WEEKS.

—A National runabout fitted with such a body built to order was described and illustrated in the August 6, 1914 issue page 275. The Spaulding touring car, made by the Spaulding Mfg. Co., Grinnell, Ia., also is made with a body similar to the one you suggest. This was described in the July 16, 1914 issue, page 125.

Leather Strips Prevent Body Squeaks

Editor THE AUTOMOBILE:—Would it be a good plan to put between the bolted on parts of an automobile some material that would help to eliminate the everlasting squeak that is almost always present? Do you know of anything that would be good to use for this purpose?

Augusta, Maine. GEO. E. GAY.

—If you are referring to body squeaks these may be eliminated by placing leather or lead strips between the parts that are causing the noise. There is no objection to the use of these strips except that it is a certain amount of trouble to apply them.

Wants Starter for Buick

Editor THE AUTOMOBILE:—I have a 1913 Model-25 Buick, and would like to have you recommend a starter which could be installed on this car at a reasonable price, and which would give satisfaction.

Nashville, Tenn. K. C. HARDCASTLE.

—Below is a list of starters taken from the *Automobile Trade Directory*, one of which you might use. All types are included because you have not given very definite information as to the kind you want.

Compressed Air

Auto Air Appliance Co., Annapolis, Md.
Crescent Co., Detroit, Mich.
Gemmer-Detroit Starter Co., Dime Bank Bldg., Detroit, Mich.
Ham-Meix Mfg. Co., West Eleventh street, Indianapolis, Ind.
Janney Steinmetz & Co., Philadelphia, Pa.
Kellogg Mfg. Co., 3 Circle street, Rochester, N. Y.
Lipman Mfg. Co., 211 Pleasant street, Beloit, Wis.
Manzel Bros. Co., 320 Babcock street, Buffalo, N. Y.
Thurber Rotary Starter Co., Detroit, Mich.

Electric

Adams Bagnall Electric Co., Cleveland, O.
Apple Electric Co., Newark, N. J.
Dayton Engineering Laboratories Co., Dayton, O.
Dyneto Electric Co., Syracuse, N. Y.
Electric Auto Lite Co., Toledo, O.
Emerson Electric Mfg. Co., 2024 Washington avenue, St. Louis, Mo.
Fisher Electrical Works, Detroit, Mich.
Gray & Davis, Boston, Mass.
Hartford Suspension Co., Jersey City, N. J.
North East Electric Co., Rochester, N. Y.
Remy Electric Co., Anderson, Ind.
Rushmore Dynamo Works, Plainfield, N. J.
R. C. Wells Mfg. Co., Station A, Fond du Lac, Wis.
Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.

Hand

Automatic Appliance Co., 162 Columbus avenue, Boston, Mass.
Bremer Wilson Mfg. Co., 1421 Michigan avenue, Chicago, Ill.
Knapp Bros. Starter & Equipment Co., 24th and Central avenues, Minneapolis, Minn.
National Motor Device Co., 3901 Ellis avenue, Chicago, Ill.
Perfection Auto Starter Co., 1551 Broadway, Denver, Colo.
Sanbo Starter Co., Bennett, Iowa.

Spring

American Ever Ready Co., 316 Hudson street, New York City.
Automatic Devices Co., Galesburg, Ill.
Elder Mfg. Co., 2305 N. Illinois street, Indianapolis, Ind.
Gardner Engine Starter Co., 1451 Michigan avenue, Chicago, Ill.
Modern Auto Starter Co., 2127 Indiana avenue, Chicago, Ill.
J. W. Tudor, 35 Congress street, Boston, Mass.

Quantity of Acetylene to Drive Ford

Editor THE AUTOMOBILE:—1—Regarding using acetylene gas from Prest-O-Lite tanks or carbide generator to run a Ford in an emergency, for cold weather starting would it take more or less than the two headlights use?

2—Would it damage the engine to turn it on full force?

3—How far would a cubic foot of gas run a Ford?

Danforth, Me. H. H. LANE.

—1—Much more gas would actually be required for running the motor but in the course of a week or month probably the total consumption of acetylene by the lights would be greater.

2—It would hardly damage the motor but it might give too rich a mixture for combustion.

3—Approximately 600 feet with throttle wide open. This is figured as follows: A cubic foot of gas requires 2.5 feet of pure oxygen according to the chemical equation, acetylene, $2\ C_2H_2$ + oxygen, $5\ O_2$ = water, $2\ H_2O$ + carbon dioxide, $4\ CO_2$. In other words five volumes of oxygen are required for every two of acetylene and since oxygen comprises approximately one-fifth of the air, twenty-five volumes of air are required for every two of acetylene, that is, for every cubic foot of acetylene 12.5 cubic feet of air are required. In other words 12.5 plus 1 cubic foot of gas must be taken into the cylinders. If the cylinders of the Ford took in full charges each time, the motor would consume 176.7 cubic inches or .102 cubic feet every two revolutions or 13.5 cubic feet of mixture would rotate the motor 265 revolutions. With a gear ratio of 3.64 to 1 this would correspond to 72.8 revolutions of the rear wheels. Since the wheels are 30 inches in diameter, in one revolution they will traverse a distance of 94.5 inches or approximately 8 feet and this multiplied by 72.8 gives 584 or nearly 600 feet. This figure is based on the assumption that the throttle is wide open; with the throttle only partly open the car would be driven much farther.

How to Adjust Matheson Steering

Editor THE AUTOMOBILE:—Will you please explain the adjustments on the steering gear used on the Matheson Silent Six?

Toronto, Ont. A. B. KEYS.

—Fig. 4 illustrates this steering gear. The principal adjustment is that which compensates for wear in the worm and sector. This is provided for by means of an eccentric bushing which is securely locked by a small headpin which engages notches milled in the head of the bushing. By removing the clamping bolts of these pins and removing the pins the thickness of the heads so as to clear the head of the bushing, the bushing may be turned around so as to move the sector either into or away from the worm, giving the adjustment for wear. The adjustment of the column vertically can be made by loosening the clamping bolt A on the collar B and by screwing this collar up or down the ball bearings may be adjusted.

The motion of the wheels is limited by two set screws C, which are adjustable stops for the steering gear and thus limit the motion of the front wheels.

Average Tire Mileage, 5,199 Miles

Editor THE AUTOMOBILE:—Have you any information at hand regarding the life of pneumatic tires, both shoes and tubes?

Mt. Vernon, N. Y. E. H. C.

—According to an extensive test made by W. A. Weygandt, Akron, O., an account of which is given in the October issue of the Automobile Trade Directory, the average mileage per set is 5,199. The average number of casings replaced for any and all causes is three-fourths of one for each set of tires used. The average life of an inner tube is found to be 8,543 miles. Ten different makes of tires were investigated, the number of sets of each make varying from forty-three to three, the total number of sets being 145. The highest mileage by any one make was 6,221 while the lowest was 2,816.

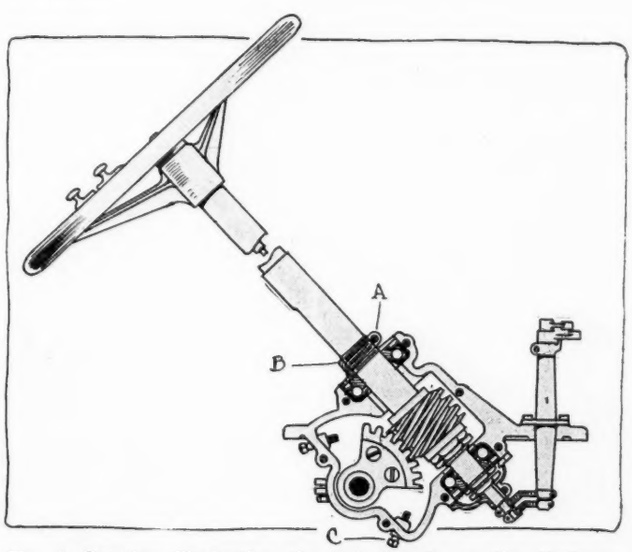
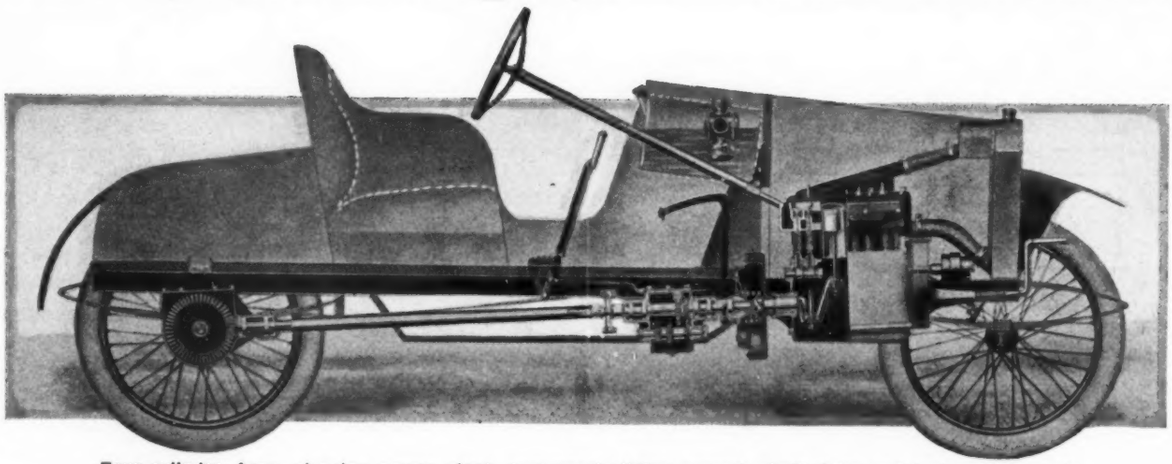


Fig. 4—Drawing illustrating the adjustments on the Matheson Silent Six steering wheel

Four-Cylinder Argo $295—Has Shaft Drive



Four-cylinder Argo, showing power plant, two-speed sliding gearset, shaft drive and fuel tank in dash

IN bringing out the Argo car, Benjamin Briscoe and his associates in the Argo Motor Co., Inc., Jackson, Mich., have undoubtedly reached a very low price level, the machine being offered at $295. It is equipped with a four-cylinder, water-cooled motor, has shaft drive and a sliding gearset. The total weight is given at 750 pounds, the wheelbase is 90 inches and tread 44 inches. Cars are now being produced at the plant in the Michigan city, and it is expected to soon get under way at a good rate.

Motor Characteristics

The motor 2 15-16 by 4, is of the L-head type having cylinders and crankcase cast in one block. Access to the crankshaft bearings is through the plate at the bottom of the case. Three-point suspension is used.

The car drives from the left, and spark and throttle levers are on the steering column. With gearshift in the center, and with a single pedal to operate the clutch and braking system, the operation of the car is made very simple. The brake drums are 8 inches in diameter.

Wire wheels are fitted, and they carry 28-inch tires. Only one body type is fitted, that being the open-sided roadster which gives comfortable accommodation for two passengers, the seat measuring 24 by 42 inches, and there being 38 inches of leg room.

Gasoline consumption is low, figuring to from 35 to 40 miles per gallon, it is said. Speeds anywhere from 5 to 40 miles an hour are attainable on level ground, while the car can negotiate a 10 per cent. grade on high gear.

Top and windshield are supplied at an additional cost of $20.

The motor, which has a horsepower of from 8 to 12, is a good example of the development which has come in the last year or so in the making of the small four-cylinder type. The moving parts, valves, camshaft, crankshaft, pistons and connecting-rods are all designed along the same lines as larger motors.

In order to combat vibration, to insure against excessive wear and to allow of high piston speeds, the reciprocating parts have been made light in weight, the total for piston, rings, wristpin, connecting-rod, bolts and bearings being less than 2 pounds, it is claimed.

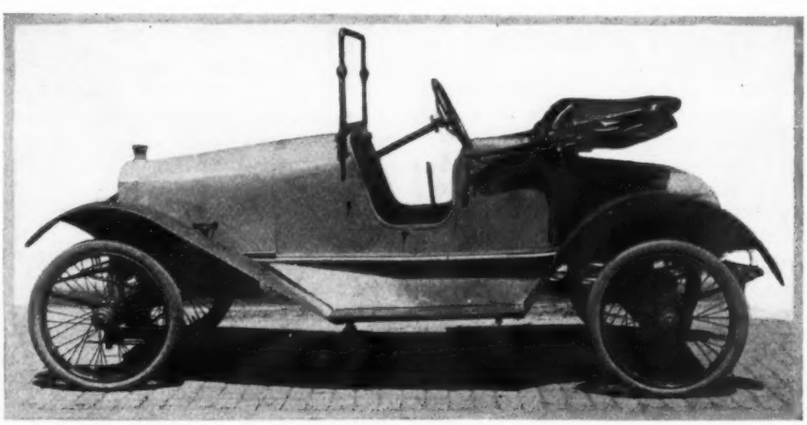
The valves on the right have a diameter of 1 3-16 inches. They are interchangeable, have adjustable push rods, and tappets bearing on the cams. The crankshaft, of carbon steel, works in two main bearings. The front one measures 1 3-16 inches diameter by 1 5-8 inches length, and the rear is 1 3-8 by 2 inches. Drop forged connecting-rods are 9 inches long and have two-bolt strap ends and connect to the pistons by 1-2-inch steel pins. Camshaft diameter is 1 inch.

The motor uses Atwater-Kent ignition apparatus, gets its gasoline by gravity feed from a 6-gallon tank under the cowl, is cooled by thermo-syphon in connection with a honeycomb radiator, and is lubricated by a self-contained, constant-level system in which the rod ends splash oil to the bearing surfaces and the level is maintained by a cam-operated plunger pump. The oil reservoir capacity is 6 quarts.

The motor is not of the unit power plant type, the gearset being placed amidships and hung from the frame. Consequently, the flywheel is not housed in, and in it is placed the internal cone type of clutch which is leather faced.

The sliding gearset provides two forward speeds, and reverse. The control lever is in the center.

Back of the gearbox, the propeller shaft is fitted with a universal joint, after which it enters a torsion tube attaching at its rear end to the rear axle housing. This tube takes the drive. The rear axle is semi-floating and has bevel drive with a ratio of 4 to 1, the gears being of chrome vanadium steel and shafts carried on ball bearings. Elliptic springs are used front and rear.



Side view of Argo, showing wire wheels, left drive and center control

The Engineering Digest

Slidable Camshafts—In This Case Arranged for Compression Relief Only

AMONG the more obvious means for securing reserve speed and power for a motor intended to be operated normally at a maximum of, say, 1,000 revolutions per minute, an arrangement for having the camshaft slidable and the cams formed so as to produce different valve-timing at different motor speeds is frequently contemplated, although some unsolved problems with regard to the shaping of the cams and tappet rollers are involved, as well as new dispositions for bringing the gear speeds into harmony with the desired vehicle speeds in each case and with the enlarged range of useful motor speeds. As against these difficulties, the advantages to be gained by a practicable consummation of the plan seem sufficiently important—in the way of reduced motor dimensions, improved fuel economy and efficiency at all speeds and reduced wear or deterioration of the motor speed selected as normal—to make designers pay considerable attention to the problem, and sooner or later motors may therefore be looked for to appear which may be operated with full volumetric efficiency and suitable valve-timing at any speed between 600 and 2,500 revolutions, for example. The fact that slidable camshafts are also employed, as by Saurer and the Panhard firm, in order to utilize the motor for braking purposes on long declivities, and for facilitating motor-starting by relieving the compression, renders the question of the most suitable mechanical means for sliding the camshaft only so much more actual, and on these grounds there is presented herewith the construction used for this purpose in Drayson motors, which are among the very few made especially for commercial vehicles in England.

These motors are made in a variety of models having 1, 2, 4 or 6 cylinders, and the illustration of the camshaft mechanism, in Fig. 1, refers to the 25-horsepower, 4-cylinder model with 4 1-8 by 4 1-2 inch bore and stroke. The object of the construction is solely to afford means for compression relief by lifting the exhaust valve slightly during the compression stroke. The *Automobile Engineer* of October 8 describes this mechanism as follows: "A large inverted tooth chain sprocket is mounted in a bearing housed in the crankcase, the camshaft carrying a long key which is made a sliding fit inside the sprocket and the sleeve attached thereto. On the other end of the shaft the bearing is capped, and a spring tends to keep the shaft pressed permanently forward, where the normal cam profile is in operation. The limit of movement imparted to the shaft by the spring is set by a collar on the shaft abutting against a ball thrust-bearing which is just discernible in the drawing, being shown in solid black at the back of the sprocket bearing. A very simple lever with a hand control is mounted outside the crankcase, the short end of the lever bearing directly upon the camshaft, so that by pulling the hand stirrup the compression release is brought into operation."

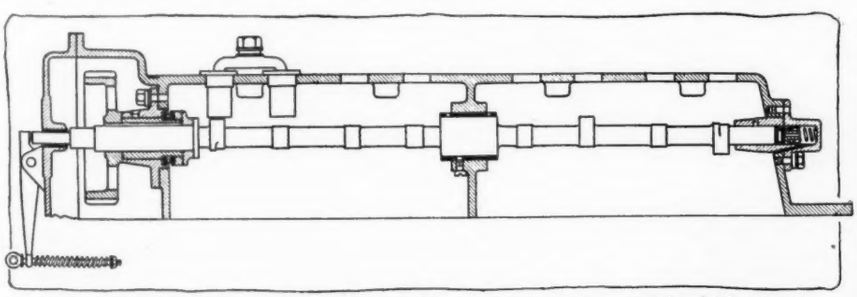


Fig. 1—Construction for sliding the camshaft in Drayson commercial vehicle motors

Decarburization of Steel Heated in Alkaline Salt Baths

IN a paper to the Iron and Steel Institute the well-known metallurgist A. M. Portevin of Paris describes the experiments by which he has ascertained that high-carbon steels suffer a considerable loss of carbon in their surface layers if they are heated in baths of molten alkaline salts, as is now common practice for the hardening operation in the case of gears and other delicate parts which should be heated very evenly in order to avoid distortion in the subsequent quenching bath of oil or water. The great rapidity with which the heating may be effected by this practice has also extended its adoption on purely economical grounds. The baths to which Portevin refers are in some instances composed of chloride of potash only, in others of chloride of potash and chloride of sodium with small admixtures of soda and ferrocyanide of potash, and in still another series of tests simple cyanide of potash is used instead of the ferrocyanide and 3 per cent. of cyanate of potash is added. In no case is the use of salts of barium mentioned.

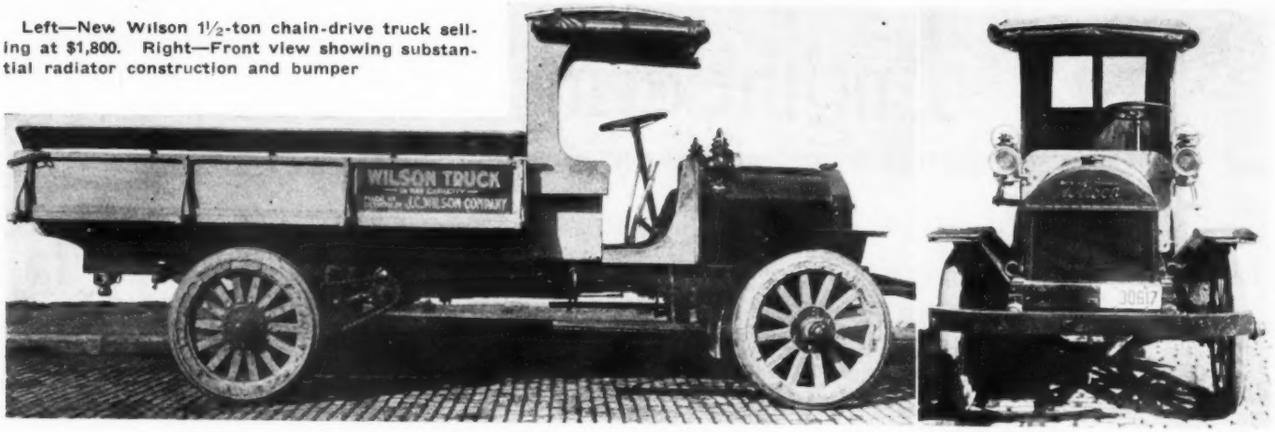
It was shown, for example, that a steel containing 1.46 per cent. of carbon came down to a carbon content of 0.9 at the surface by a 15 minute immersion in the bath, to 0.4 in two hours and to 0.2 in 5 hours; similarly that a 0.78 per cent. carbon steel came to a carbon content of only 0.5 per cent. in 15 minutes and that the decarburized layer after that length of time in the bath was from 0.1 to 0.2 of 1 millimeter thick.

On the other hand, if carbon-free Lancashire iron was immersed in the bath together with the steel, the iron absorbed carbon from the bath to a considerable extent. This was not the case, however, when cyanate of potash was added.

The depth of carburization and decarburization as well as the comparative carbon contents of the different layers were in all instances determined under the microscope from hardened, polished and etched samples.

Hardening in Cyanide of Potash

A RECIPE, probably borrowed from American practice, is given in *Werkstattstechnik* of August 15 as follows: To produce in a convenient manner a tough and hard surface on small cast-iron machine parts [perhaps the author refers to malleable iron parts—ED.] which are subject to wear, such as small pinions and cams, they are heated to dark red and quenched in a saturated water solution of cyanide of potash which is maintained at a temperature as near boiling as possible. This is done most handily by placing the solution in an iron jar at the fire in which the pieces are heated.



Left—New Wilson 1½-ton chain-drive truck selling at $1,800. Right—Front view showing substantial radiator construction and bumper

Accessibility and Simplicity Features of New Wilson Truck

Four-Cylinder Block Motor Used in 1 1-2 Ton Truck for $1,800—Combined Gearset and Jackshaft

THE J. C. Wilson Co., Detroit, Mich., long identified with the automobile industry in body-painting and trimming branches, has entered the motor truck field with a 1 1-2-ton truck listed at $1,800. This is an assembled truck including Continental block type motor, Covert combined gearset and jackshaft together with other standard parts. The truck is made with a wheelbase of 130 inches, has left drive, with center control, the motor is carried under a conventional hood with a radiator in front, and the driver occupying the same relative position as in a touring car, a cab with side and front curtains being furnished as part of the regular equipment. Final drive is by chain. The body is so located that the rear axle is almost under the middle of the load-carrying platform.

Accessibility and Simplicity

In designing this truck accessibility and simplicity had been the two factors kept in mind, and although the truck is an assembled product, it incorporates a number of special designs in the mounting of the different parts, such as motor and gearset. The most interesting of these is that of the gearset, which is a three-speed selective type, having the gearbox bolting to the differential housing on the jackshaft. It may really be regarded as a three-point suspension in that none of the strains due to frame weaving or inequality are transferred to these parts. Instead of rigidly mounting the outer ends of the jackshaft to the frame, ball-and-socket joints are used, which relieve the constructional strains. These two mountings, together with the unique suspension of the front end of the gearbox to a combination torque member and support make up the three-point arrangement.

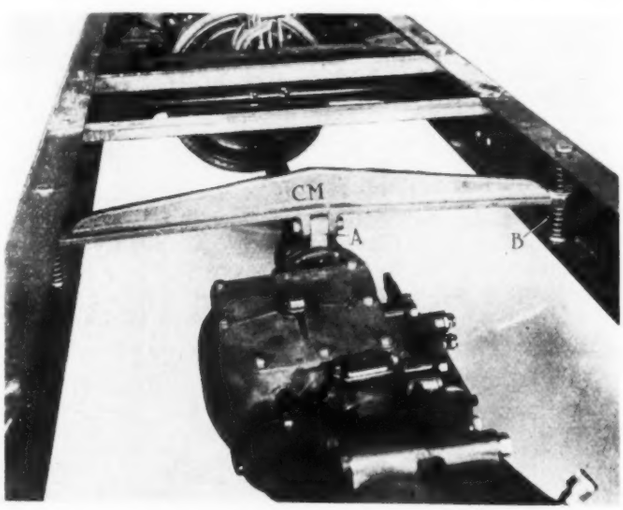
Eliminating Shocks to Jackshaft and Gears

The front gearset support is illustrated. A cross member suspends the transmission unit at its center by means of a pin connection, while the ends of this cross-piece are carried in spring buffers in the frame. Thus vibrations, driving shocks tending to twisting and road jars are not transmitted to the jackshaft or gears. By removing the pin making the connection between the gearbox and the cross-piece, the entire unit may be swung downward after the drive shaft is disconnected. This makes adjustment or inspection a simple matter.

Another place where frame weaving would cause binding has been cared for. This is the cross-shaft which serves to throw out the clutch. The ends of this shaft are carried in sockets which allow longitudinal turning of the shaft, while the sockets themselves are vertically hinged to the frame. Motion in either direction is possible, therefore, and binding cannot take place.

Both Brakes on Rear Wheels

Another commendatory feature is the elimination of brakes on the jackshaft, both emergency and service sets being placed to act on the rear wheels. This takes any brak-



Wilson 1½-ton truck, showing unique mounting of front end of gearset. The cross member C M holds it up in position through connection A. This member is supported at either end in the frame through the spring buffers B. Thus, the vibration and road shocks are not transmitted to the gearset and jackshaft. By removing the pin at B and disconnecting the propeller shaft, the entire gearbox and jackshaft may be swung downward for inspection or adjustment

ing strain off the jackshaft or chains when stopping. Large size drums 14 by 2 1-2 inches are used.

Three-Point Suspension

The motor, a Continental block-cast type, 4 1-8 by 5 1-4 is suspended at three points in a rather unusual way. Integral crankcase arms are not employed, there being separate cross pieces front and rear. These rest upon brackets attached to the frame side members, and at each point of attachment there is a single bolt going through cross member and bracket. Therefore, in order to lift the motor from the frame after the drive is disconnected it is only necessary to take out the four cross arm holding bolts. With this method of attachment to the frame, three-point support is attained by hanging the front center of the motor to the center of the front cross piece, while it is suspended from the rear member by a bolt at either side of the crankcase.

Three-Bearing Crankshaft

The motor has three-bearing crankshaft and camshaft, drives the latter by gears at the front as well as the magneto and pump shaft on the right. Valves are on the left and their stems and springs are completely inclosed by plates.

Cooling includes a substantially-mounted centrifugal pump, the bearing for which is cast as a part of the crankcase rather than having the pump assembly bolting to the crankcase. This makes the pump more rigid and is a preventive of leakage due to absence of vibration. The radiator, has the tanks bolted to the shell, while the core is of tubular type. The whole is mounted on springs which relieve it of vibration.

Constant-Level Splash Lubrication

Motor lubrication is by a constant-level splash system whereby the splash troughs are kept at a given level by an oil pump getting its supply from a reservoir. Ignition by high-tension magneto is also used.

The Wilson truck employs a cone clutch, back of which the drive is conveyed to the jackshaft through a tubular propeller shaft having an external diameter of 1 3-4 inches. This tubular construction is not new to automobile construction and is just coming into vogue for truck work. Aside from its lightness, such a shaft tends to reduce whipping to the minimum. Two spicer joints are fitted, one just back of the clutch and the other ahead of the gearset. The gears have a face width of 1 inch.

Solid Tires Used

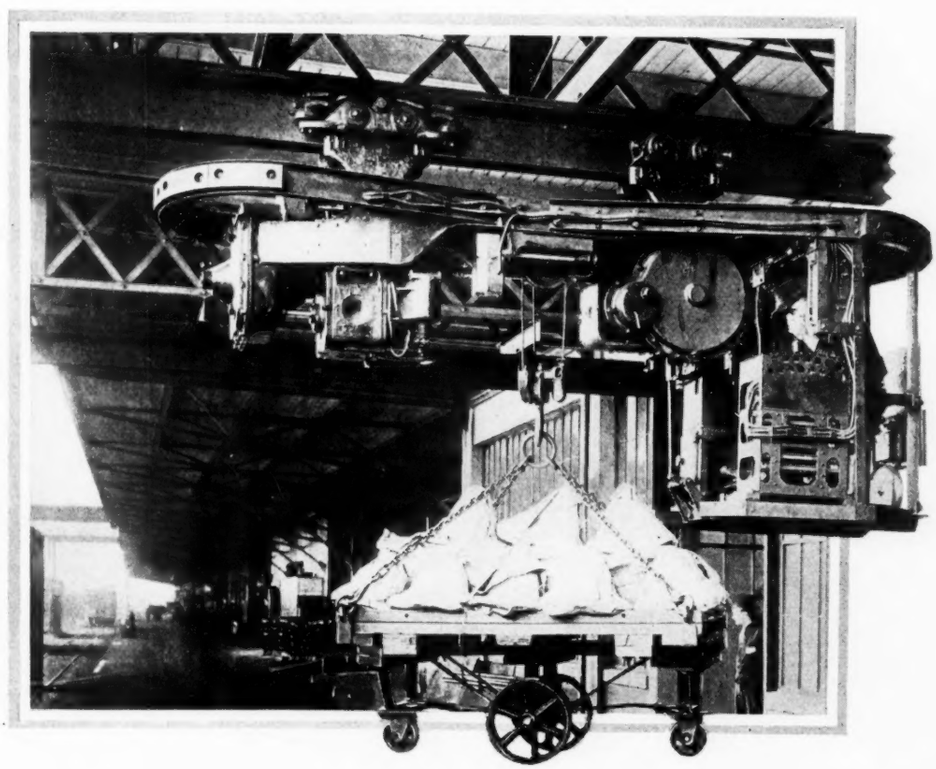
The running gear is exceedingly substantial and incorporates an I-beam front axle which has wheel spindles measuring 2 inches in diameter at the inner bearing and tapering to 1 7-8 inch at the outer; a dead rear axle having a section 2 3-4 by 1 3-4 inches with spindle dimensions at bearings 1-8 inch larger in diameter than in the front axle; artillery type wood wheels with twelve 2-inch square spokes in front, and fourteen 2 1-4 inch square in the rear. The tires are solids, the 37 by 3 1-2-inch size being used in front and 37 by 5 in the rear.

Self-Lubricating Springs Used

The frame is strongly made and braced, gusset plates assisting the cross members. The channel is 5 1-2 inches deep with a 2 1-2-inch flange, the stock being 3-16 inch. Spring suspension is by full shackled half elliptics which are made by the Detroit Steel Products Co. These have indentations in the leaves which are filled with lubricant on assembly, making them practically self lubricating. This feature together with the large number of thin leaves should make for utmost resiliency, a desirable point. The springs measure 42 by 2 1-4 front and 50 by 2 1-2 rear.

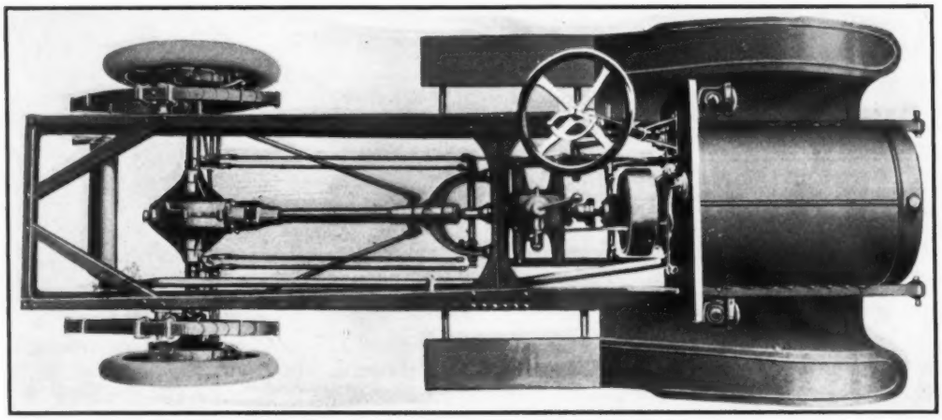
Monorail Conveyors Save Time and Labor Moving Heavy Loads in Dodge Plant

¶ *The illustration at the right shows one of the Monorail conveyors employed in the factory of Dodge Brothers, Detroit, Mich. These Monorail cars run on overhead tracks, quickly and easily moving heavily loaded trucks from distant sections of the factory to the loading platform where their burdens are packed for shipment. Each of these cars does the work of from ten to twenty men. The method of operation is readily seen from the illustration, while the figure of the workman in the right hand lower corner gives an idea of the dimensions of the conveyor and its load.*



G. M. C. 1,500-Pound Chassis for $1,090

Is Gasoline Type— Driver's Seat and Full Road Equipment, But No Body— With Express Body $1,215



Plan view of new G. M. C. 1,500-pound gasoline truck chassis which sells without body for $1,090

THE General Motors Truck Co., Pontiac, Mich., is now offering a 1,500-pound gasoline truck chassis for $1,090. This is without body of any kind but includes driver's seat, and full road equipment. It is also offered with flare board express body 45 by 98 inches inside for $1,215. In addition to the capacity rating of 1,500 pounds which refers to the load only, a body allowance of 750 pounds is permissible on the chassis. The complete chassis weight without body is given at 2,360 pounds.

The truck is an example of good truck engineering for the class of service which such a vehicle would naturally be called upon to perform, and its parts are amply heavy for such work. From the power plant, the power goes back through an inclosed propeller shaft to the rear axle, there being no jackshaft construction.

Four-Cylinder Block Motor

The engine is a four-cylinder, block-cast, L-head design having cylinder dimensions of 3.5 by 5 which has an S. A. E. horsepower rating of 19.6. It is capable of propelling the truck under load at speeds up to 20 miles per hour and is specially built for its heavy duty work. The power plant is three-point suspended and is located under a hood in front of the seat.

The motor is conventionally designed throughout and its working parts are constructed of excellent materials. The three-bearing crankshaft is a drop-forged nickel steel part and its bearings are of bronze-backed babbitt as are also the connecting-rod bearings. Camshaft and connecting-rods are also drop forgings, while pistons are gray iron castings fitted with three rings and having a length of 3 3-4 inches. The piston pins are hardened and ground and work in bronze connecting-rod bushings, they being fixed to the pistons. Helical timing gears drive the camshaft and magneto and pump in the regular way. The valves are of 1 11-16 inch diameter and all of the valve mechanism is completely inclosed.

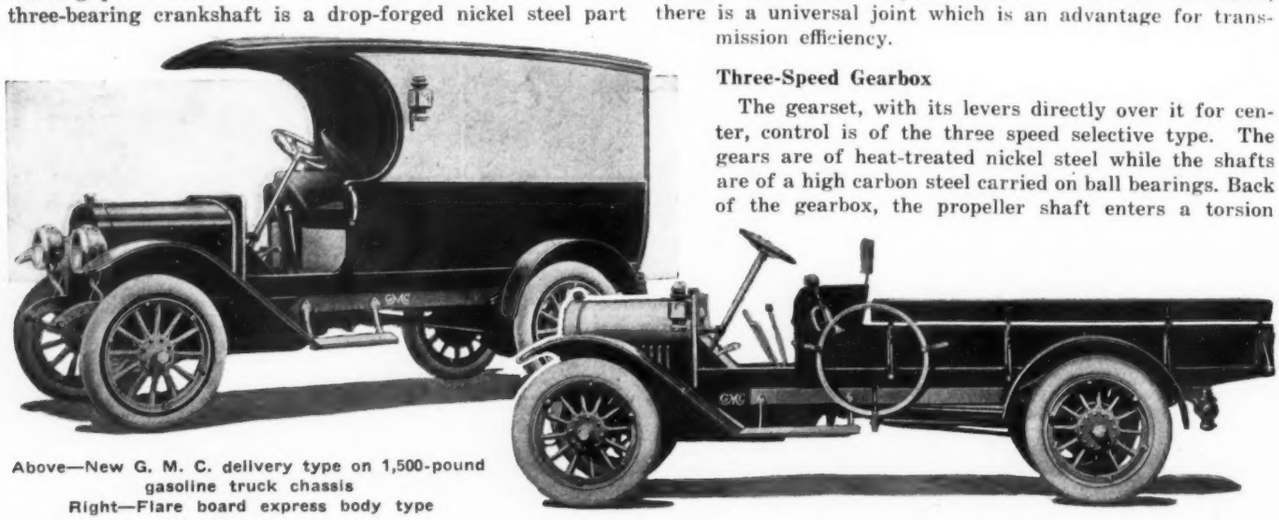
The oiling system incorporates a combination force feed and constant level splash arrangement whereby a plunger pump driven by an eccentric on the camshaft supplies oil to the timing gears. The oil drains back to the constant level splash pans under the connecting-rods for lubricating by splash the pistons, connecting-rods, crankshaft and camshaft bearings.

A substantial tubular radiator specially designed for truck service is the main cooling agent, being aided by the centrifugal pump and the ball bearing, belt-driven fan. The ignition system is of the single type with jump spark.

Back of the motor, the power is transferred to the rear through a cone clutch acting in the uninclosed flywheel. The clutch is leather-faced and has spring inserts to effect gradual engagement. Between the clutch and the gearset which is located amidships on the end of the motor subframe, there is a universal joint which is an advantage for transmission efficiency.

Three-Speed Gearbox

The gearset, with its levers directly over it for center, control is of the three speed selective type. The gears are of heat-treated nickel steel while the shafts are of a high carbon steel carried on ball bearings. Back of the gearbox, the propeller shaft enters a torsion



Above—New G. M. C. delivery type on 1,500-pound gasoline truck chassis
Right—Flare board express body type

tube fitted with a yoked front end hinging to the frame cross member. There is another universal between the torque tube and the gearbox. Radius rods run from the outer ends of the rear axle housing to the front end of the torsioin tube, giving a strong construction.

The rear axle to which the tube bolts through flange construction is of the three-quarter floating type with fixed drive shafts of heat-treated nickel steel. Brakes are in the rear wheel drums, external contracting and internal expanding.

The steering is on the left, operating by means of a screw and nut mechanism of irreversible type. The wheel gives ample leverage with its diameter of 17 inches.

The frame is substantially built of open-hearth pressed steel with strong bracing. The center cross-member widens at the side rails to give a good riveting surface, while at the rear the cross-member is braced by pieces running diagonally across the corners.

Springing, ever important in a truck, is very resilient in this new GMC and should tend to lessen depreciation due to vibration and jarring. The rear springs are elliptic mounted on swivel hangers outside the side members of the frame. They measure 40 by 2 inches and each half has eight leaves. The front half elliptics are 36 1-2 by 2 inches.

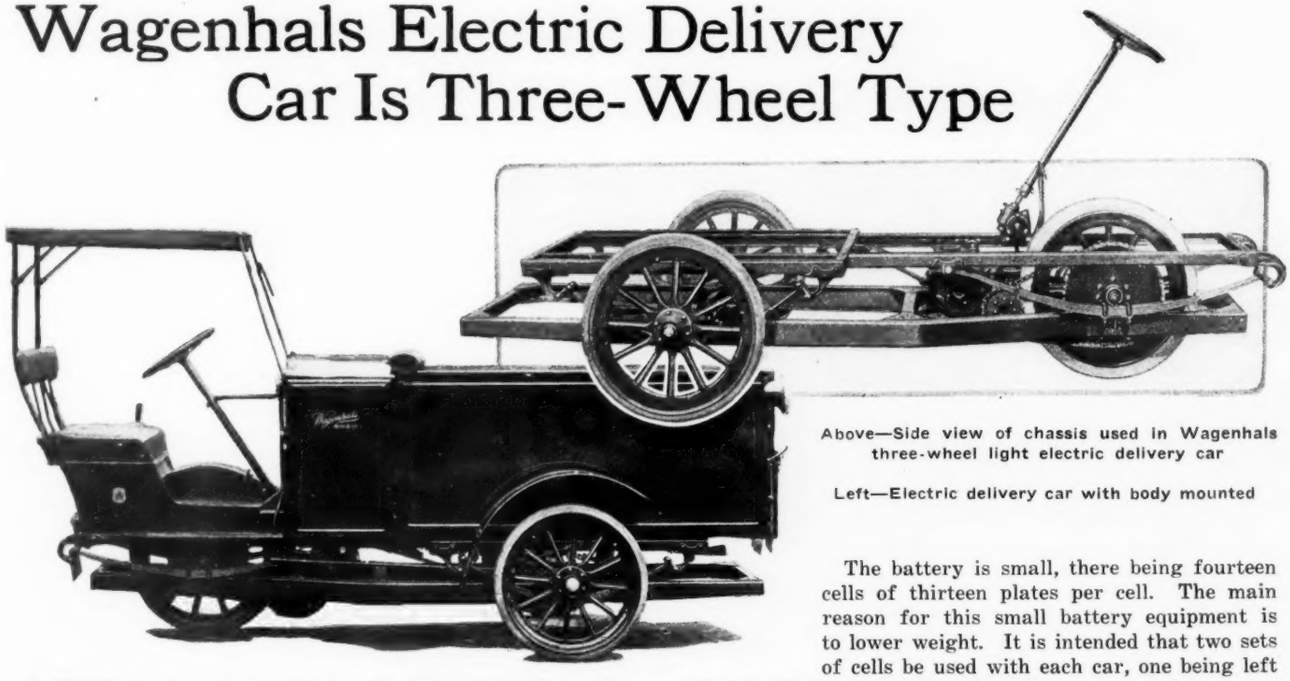
Pneumatic Tires All Around

As another factor for reducing vibration and also because of the fact that the truck is of the moderately high-speed type, the tires are of pneumatic type, front and rear, size 35 by 5. They are mounted on demountable rims which are almost a necessity when the time element in delivery work is considered.

The gasoline tank, located under the driver's seat, has a capacity of 13 gallons.

The wheelbase of the new GMC is 122 inches, while a tread of 56 inches is employed front and rear.

Wagenhals Electric Delivery Car Is Three-Wheel Type



Above—Side view of chassis used in Wagenhals three-wheel light electric delivery car

Left—Electric delivery car with body mounted

AFTER much experimentation, the Wagenhals Motor Co., Detroit, has brought out a three-wheeled light electric delivery car similar in appearance to the gasoline machines of its make. The car has a rated capacity of from 500 to 800 pounds, weighs complete, 1,650 pounds and is to sell for the low figure of $575.

The frame construction used on the new car is the same in design as that on the gasoline type, there being a main frame which carries the axles and drive parts and a sprung subframe to which the body attaches. The two wheels are at the front and turn on spindles to take care of the steering, while the third wheel which does the driving is placed at the rear between the frame rails. This construction is patented.

The electric motor used is a General Electric type, rated at 24 volts and having a speed of 1,600 revolutions per minute. It is placed with its armature shaft transverse and connects through a spur gear to another shaft parallel to the armature shaft. At the other end of this jackshaft there is a sprocket which drives through a 1-inch pitch roller chain to the larger sprocket attached to the driving wheel. The reduction between the motor and jackshaft is 4 to 1 and between jackshaft and rear wheel 2.5 to 1, so that the total reduction between motor and wheel is 10 to 1. Simplicity is gained by the use of one driving wheel as no differential is required.

The battery is small, there being fourteen cells of thirteen plates per cell. The main reason for this small battery equipment is to lower weight. It is intended that two sets of cells be used with each car, one being left on charge all the time while the other is engaged in active service. This is very feasible, due to the extreme ease with which the cells may be slipped in or out.

The battery, however, is good for from 25 to 35 miles per charge, the average speed of the car being 12 miles an hour.

The controller and switches are also very accessible under the drive seat. The controller handle is at the left of the seat and operates a drum type of controller which gives four speeds ahead and two reverse. The steering gear is of the worm and gear type, irreversible. Speedometer, ammeter and voltmeter are placed on the dash.

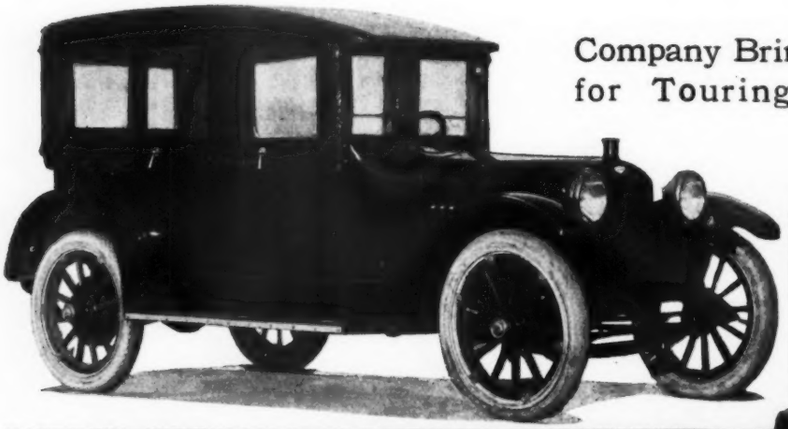
The front wheels carry 28 by 2-inch solid motor tires, while the rear is 30 by 2 1-2, also a solid. Due to the short wheelbase of the car—67 inches—it can be turned in a short space of 24 feet. This makes the car very desirable for traffic maneuvering. Tread is 56 inches.

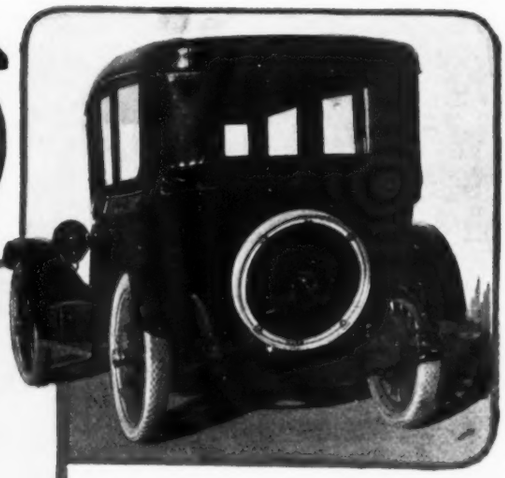
Open or closed bodies are optional. The frame is of wood, but sheet steel covers it. The inside dimensions of the loading space are 70 inches length, 35 inches width and 29 inches height. The open body is furnished with a tarpaulin cover, while a railing runs around the top of the closed job.

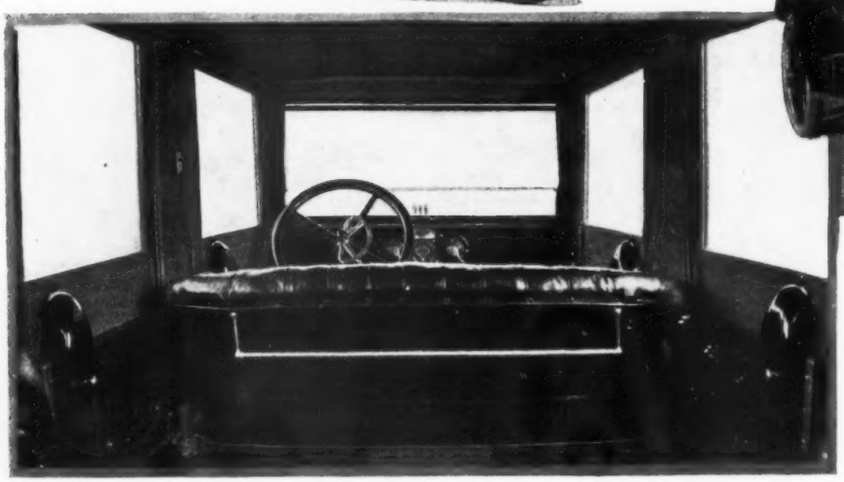
A canopy top is placed over the driver's seat, while side curtains and windshield are also provided. The equipment includes electric lamps and electric horn.

Sedan and Coupé Tops for Hupmobiles

Company Brings Out Removable Types for Touring Cars and Roadsters







Upper left—Hupmobile touring car for 1915 fitted with removable sedan top costing $165

Above—Rear view of touring car fitted with sedan top. Note neat fit

Left—Interior of sedan. The pieces on the doors house the latch levers for the outside handles

REALIZING the demand from a great many automobile owners for tops which will convert their open cars into watertight and storm proof inclosed vehicles for winter driving, the Hupp Motor Car Co., Detroit, has evidenced its progressiveness by bringing out removable sedan and coupé tops for attachment to standard Hupmobile touring cars and roadsters.

These tops, when in place, really convert the open models into closed cars in every sense of the word as will be seen by a glance at the illustrations. The cost is nominal, the coupé top being procurable for $125 and the sedan for $165.

Attachment Is Simple

These tops have been designed so that their attachment is a comparatively simple matter. It is said that two men can easily put one in place. Six points of attachment to the body are provided in the sedan top. The regular folding top irons are pressed into service and iron pieces fixed to the removable top bolt to them. As the touring car has a one-man open top which supports only at the rear and at the windshield, there is, of course, no intermediate side iron on either side of the body, so another form of screw attachment fixes to the body just back of the front doors. A screwdriver and monkey wrench are the only tools required.

In order that the doors in the top will move with the body doors, iron cleats attached to the hinged door sections of the top screw into the body doors, making a rigid construction, moving as a unit when the doors are opened. The latches of the body doors are within the body, so that some means of opening them from outside must be employed. This is accomplished by providing exterior handles in the top doors which run down to the body door latch handles and turn them when the outside handles are turned. The levers taking care of this are housed within the black metal pieces seen at each door in the interior views.

Watertight and Dustproof

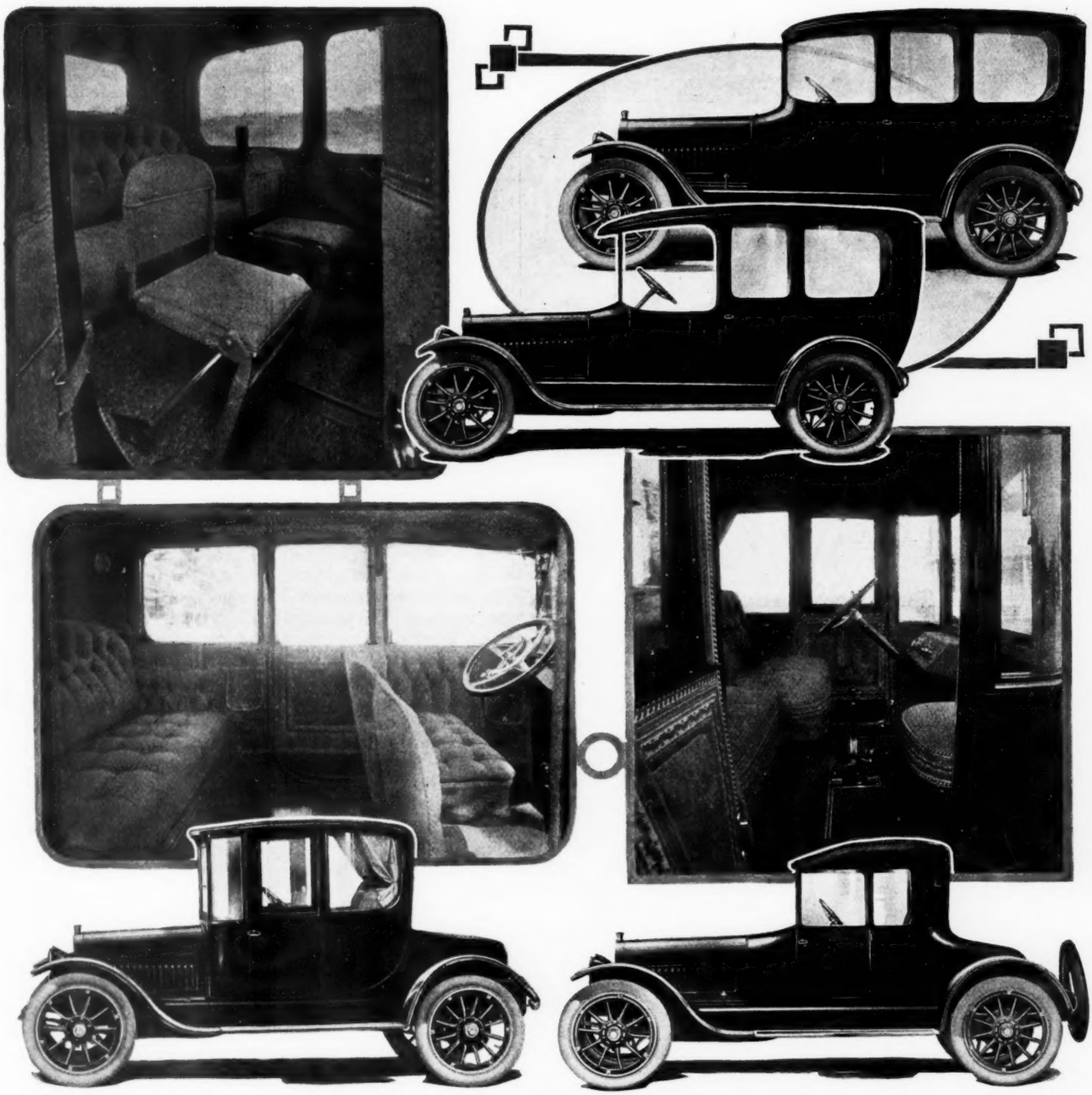
The Hupp company is particularly proud of the way in which the top is built to fit around the windshield so as to render it absolutely watertight and dustproof and to give all the warmth and cosiness of a limousine or coupé built permanently as such.

The equipment of these tops is complete in all details. There is an electric dome light controlled by a switch at the driver's left hand; windows are of coach glass and in the rear compartment of the sedan and in the coupé are adjustable for ventilation. The interior is lined with a fawn-colored material just as many a limousine is finished. In the sedan top, there is a window in each door, and one back of the rear door on either side besides the large rear window. The coupé top has two windows in each side and a rear one also.

These tops are constructed of aluminum and wood fastened with the forged iron supports to insure freedom from rattle.

The weight of the sedan top is 150 pounds and of the coupé 85 pounds, so it is evident that very little is added to the car weight by them.

Chandler Has Four New Closed Bodies



New Chandler body types. The cars illustrated are: Top, sedan; below it, limousine; bottom left, coupé; and bottom right, cabriolet. The interior view at the upper left shows the extra seats in the limousine. At the middle left is the interior of the sedan and at the right interior of the coupé, showing the seating arrangement for three passengers. Note the rounded glass in the front

CLEVELAND, O., Oct. 24—The Chandler Motor Car Co. is delivering to its dealers throughout the country the new closed body types brought out this year for the first time. The new bodies consist of a cabriolet listed at $1,950, a coupé at $2,200 and a sedan and limousine costing $2,750 each. All these bodies are interchangeable on the standard six-cylinder Chandler chassis and weigh only 100 to 175 pounds more than the ordinary touring body. Aluminum and pressed steel are the materials used in their construction.

With the exception of the cabriolet the bodies are upholstered in gray cloth and Bedford lace and trimming, the cabriolet being finished in hand buffed upholstered leather.

The cabriolet is a three-passenger car, the driver's seat being 18 inches wide with a seat alongside 26 inches in width placed just a little back of the front seat. The coupé is also a three-passenger.

The seat arrangement of the limousine is novel, seven-passengers facing forward with two extra seats having backs when folded into position. By another arrangement these extra seats can be adjusted so that two of the passengers in the tonneau face rearward.

The sedan is a five-passenger model of the owner-driver type. The sedan and limousine rear seats are 47 inches wide and seat three passengers.

One of the features of these bodies is their light weight, the cabriolet weighing 2,950 pounds, the coupé 3,050, the sedan 3,125 and the limousine 3,200. Equipment is very complete on all types.

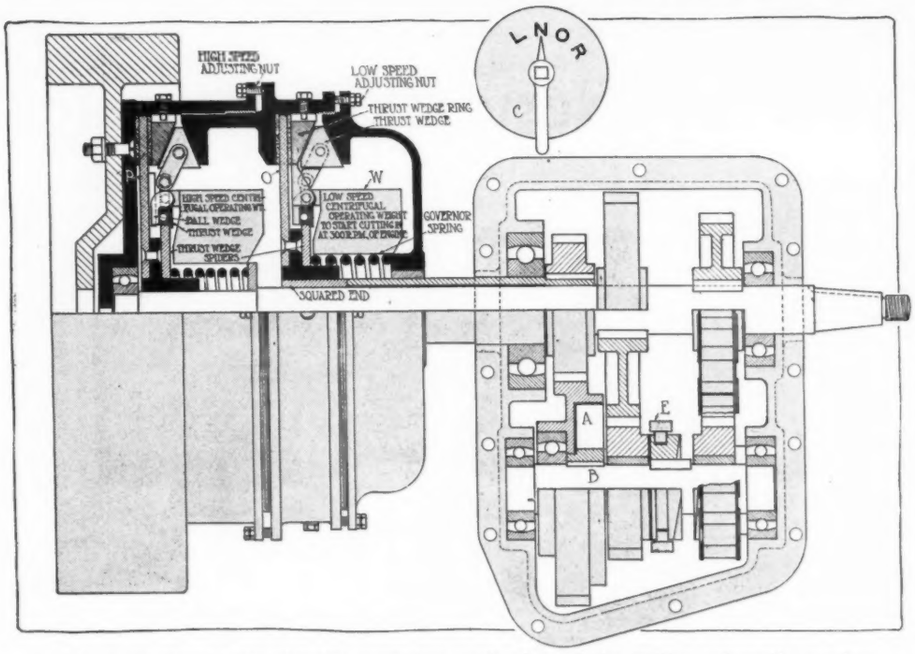


Fig. 1—Sectional view showing operating mechanism of the Zeitler automatic gearbox

Zeitler Gearbox Makes Automatic Changes

Centrifugal Force Employed To Shift Gears From Low to High Speed

AN automatic transmission has been designed by R. S. Zeitler in which manual shifting of gears is intended to be eliminated, the gear reduction of the car being determined by the speed at which it is traveling.

If this gearset works successfully and you are traveling along a level road and suddenly attempt to climb a steep hill, the moment the car slackens in speed to a definite point the gears would shift, giving the reduction which would enable the car to climb the hill without laboring. This is accomplished by centrifugal shifting arrangements.

Each given speed exerts a different amount of centrifugal force on a series of weights mounted in the shifting mechanism. The instant that the speed slackens or increases to such a point that the force exerted on these weights reaches a certain definite point the gears are changed. The gearbox consists, as shown in the accompanying drawings, of multiple single clutches in connection with mutiple sets of gears combined so as to give the desired results. The clutches are the parts that are operated by centrifugal force.

With this gearbox the engine starts without load and at a pre-determined speed of the engine, say at 300 revolutions per minute, the weights would impart a sufficient force to cause a series of thrust wedges to rise against their retaining springs, forcing the disks and friction rings together thus driving the low-speed gears.

Two Separate Shafts

The low gears cause the main shaft to revolve. This shaft in turn rotates the high or next set of clutch weights and, as the car gains speed, the second set of clutches speed up and as they overcome their spring resistance drive the direct shaft, automatically releasing the low gears. As the high speed clutches start to drive, the pinion on that shaft exerts a force on its gear which is on the secondary shaft, driving it faster than it is driven by the low clutches; and, through a slip gear the low set of gears are released in proportion to the amount of engagement of the high clutches. This permits the secondary shaft to move faster than the slip gear is driven. When the car or driveshaft is slowed down to a point where it is necessary to use the low gears, they automatically come into action by means of the slip gear. The low gear clutch is in at the same time as the high clutch.

Referring to the drawings, Fig. 1 gives a sectional view through the shifting mechanism and the gearbox. As the engine starts, the flywheel and the housing, which is shown bolted to it, are carried around with the crankshaft. As the speed increases the weights W rise and the thrust wedge acts against the thrust wedge ring until at a given point, which may be 300 revolutions per minute, the resistance of the governor spring is overcome and the low speed shaft indicated in Fig. 2 commences to be driven through the clutch O. As the speed increases the high speed centrifugal operating weight begins to lift against the high speed governor spring, inserting the wedge against the high speed thrust wedge ring and forcing into engagement the disk clutch P which operates the high speed shaft.

The slip gear consists of an ordinary gear, carried loosely upon the secondary shaft. It is indicated at B, Fig. 1. Part of the interior is so made that a disk can be rotated inside the gear. This disk is keyed to the secondary shaft and has slots cut in it as shown in Fig. 2. In the slots are pawls P. When the driving member, the outside carrying the gear teeth, is rotated by the pinion, the pawls rise and grip the inner surface of the gear as shown at A, Fig. 2. The harder the pull the more the grip as the pawls tend to assume a vertical position, giving a wedge effect. When the secondary shaft is rotated more rapidly than the pinion the pawls are free to lag, but when the reverse is the case, the pawls grip the gear. By this method the gears are always in mesh and the inventor claims that intermediate gears are unnecessary.

May Be Locked in Speed

A small plate is provided for the dash or steering wheel which holds a lever arranged to lock the gearbox in either low, neutral or reverse position. This is accomplished through a dog clutch E, Fig. 1. The length of the gearbox and shifting mechanism on an engine, using a 17-inch flywheel is 21 7-16 inches from the face of the flywheel to the rear end of the gearbox. This is for a two-speed transmission.

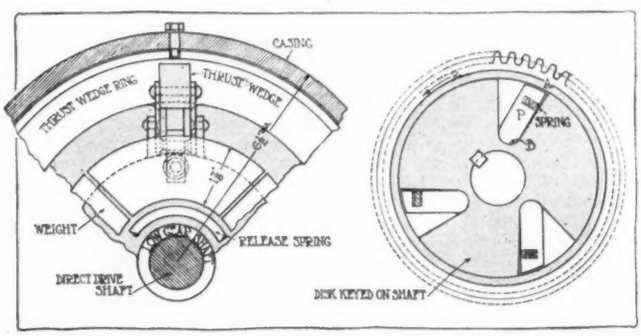


Fig. 2—Clutch engaging mechanism and slip gear with pawls

New Body Styles for White

Chassis Carries Many Improvements—New Starter Position —Wheelbases Longer—All Bodies Lower—New Clutch Brake—Column Control for Lights, Etc.—Other Refinements

MAKING its six-cylinder car only for customers but continuing its two four-cylinder models with an array of chassis improvements and an entire new line of bodies is the passenger car program of the White Co., Cleveland, O., for next year. The prices of the four-cylinder models are slightly higher than for 1914, a fact due to the entirely new line of bodies, embracing a host of de luxe feature coupled with many additions in the line of chassis equipment. The model 30, a five-passenger touring car with complete equipment lists at $2,700 and the model 45 lists at $3,800. There is no list on the six, as it will be made according to custom orders only.

Bodies All Lower

Not since it introduced its gasoline cars has this company carried out such a general line of improvements in the chassis, not to mention the entire new body designs. All models have had the wheelbases lengthened so as to better carry out the streamline body ideals. The bodies are all approximately 3.5 inches lower, in fact the frames are this distance nearer to the road level than heretofore. To do this the clearance has still been retained at 10 inches.

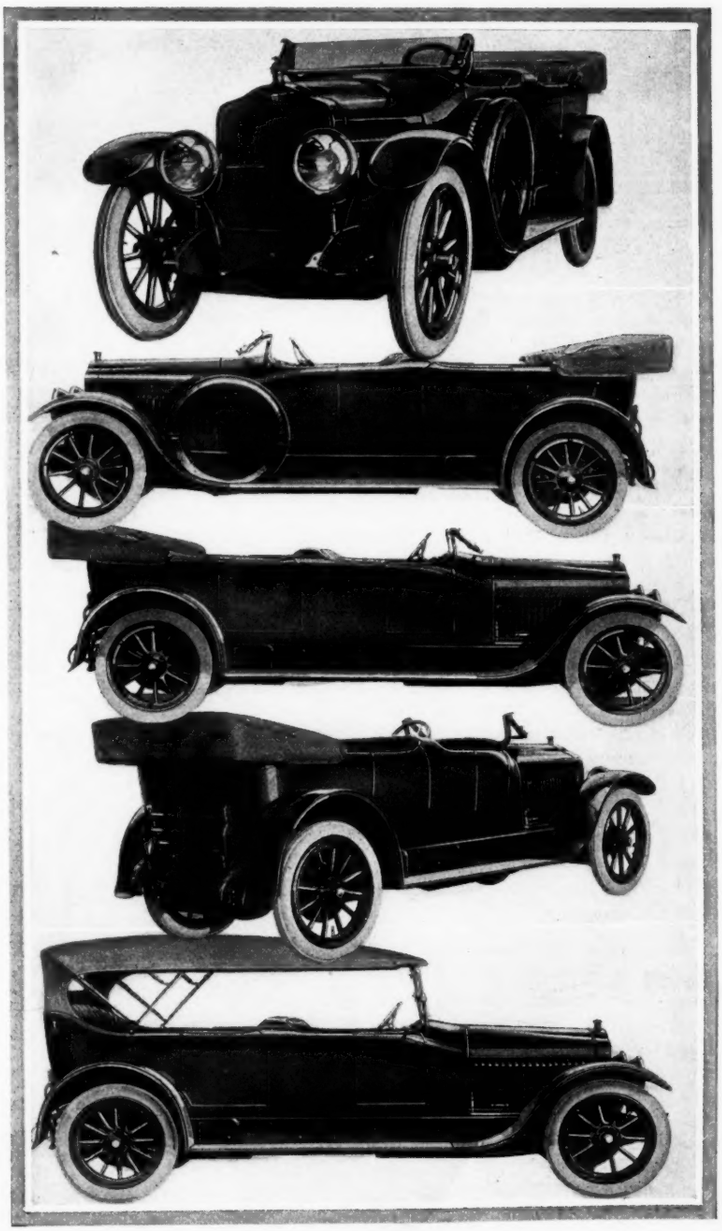
While the general chassis characteristics such as block motors, disk clutches, four-speed gearsets, etc., have been retained without alterations in their major details not a few alterations appear in connections with the parts used with them. For example, the Entz combined motor-generator has been removed from the side of the engine and is located at the right in rear of the gearbox where it is driven by silent chain from the flywheel and a propeller shaft with universal joints.

The gravity and pressure gasoline feed systems of this season have both been abandoned in favor of the Stewart vacuum-gravity system, the gasoline tanks now being carried at the rear, and the carbureters raised high on the side of the motors where they are most accessible and where the intake manifolds are restricted to short elbows.

Control on Steering Column

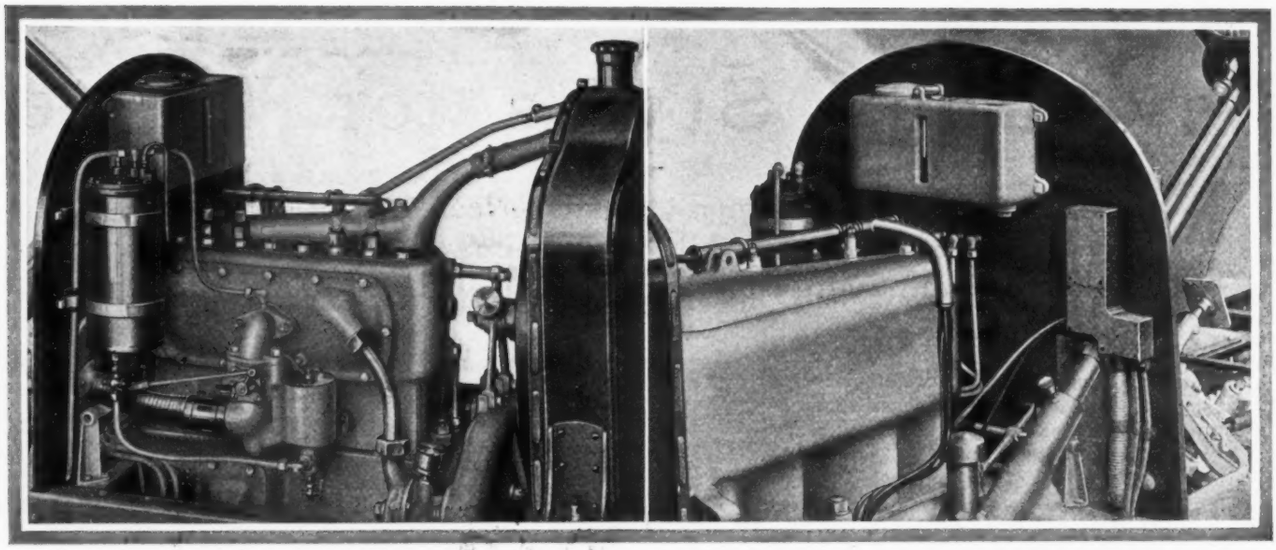
On the steering column below the wheel are mounted all of the lighting, starting and ignition controls, all conveniently grouped on opposite ends of a drum-shaped switch, with the light buttons on one end and starter and ignition control on the opposite end.

Many other minor chassis improvements have been introduced: First comes the use of a new form of clutch brake, described later, and this is followed by an improvement in the clutch release. The radius rods are altered, an equalizer is inserted in the service brake connection, etc.



THE 1915 WHITE STREAMLINE BODIES

At the top is a three-quarter front view of the White model 45 with its streamline body. The radiator is higher than heretofore; the hood is much larger and flares to the cowl. There is not a straight line in the body sides. In the lower illustrations is shown the center cowl back of the front seats. A new form of baggage rack is used in rear. The one-man top adopted for the first time is designed in conformity with the body curves. The windshield is tilted back more than 2 inches



Right and left side of White motor. The Stewart vacuum-gravity gasoline feed tank is seen on the dash. The carbureter is higher. On the dash is the rectangular-shaped oil tank and above the steering column is the junction box for the wiring

On the model 45, the large four, as well as on the six the front axle is dropped between the steering knuckles and the spring seatings in order to lower the frame. The frame is dropped 4.5 inches in front of the rear axle and the rear springs are mounted under the axle. The frames in all models are under 25 inches from the ground.

New Style Bodies

The new line of bodies is most complete embracing practically every design of open and closed lines. In all the hood is immeasurably larger than heretofore so that if you sight a line from the top of the radiator over the top of the cowl, over the back of the front seats and over the rear of the tonneau it would be nearly straight, this line in reality rising very slightly to the back of the tonneau. There is not a straight line in the body side; it is a curve from front to rear with the widest part of the body immediately in rear of the front seats, gradually narrowing fore and aft.

This curve-line effect is further accentuated by the double cowl, namely a cowl constituting the dash and another back of the front seat, this being the first example of a stock American body in which this center cowl is used. Custom-made jobs have used this second cowl which was introduced over a year ago in Europe, but it has not been adopted as a stock body job.

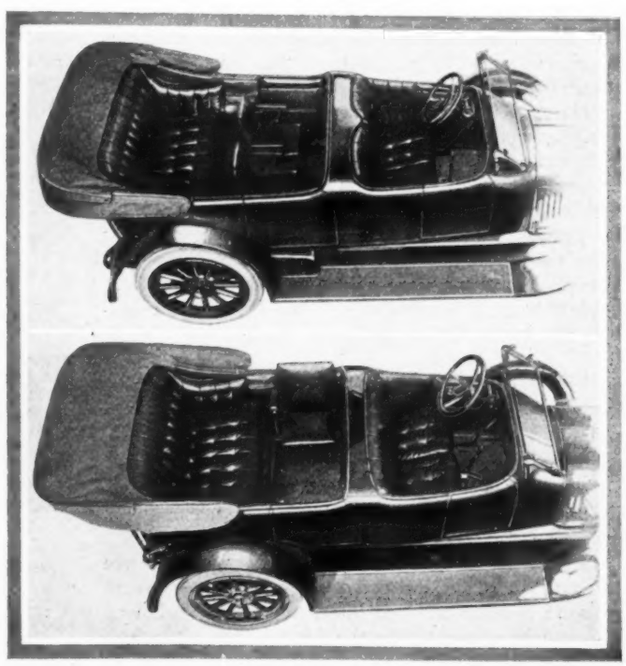
Flare in Hood

Heretofore the White hood has been the same size at the radiator as at the dash, but not so now; it has a pronounced flare. The curve of the cowl is a continuation of that in the hood, namely, in that this cowl curve instead of rising abruptly and being concave is convex so that it leads the eye back to the slightly convex curve of the center cowl, and this in turn leads the eye to the curve or line at the back of the tonneau. Thus do the body curves not lead the eye away from the body, as is so often the case, but rather lead the eye into the body at a point nearer the rear.

Considering a cross section of the body of a touring car taken immediately in rear of the front seats, the body is narrower at the top of the sides than at the floor. To this construction the expression tumble-in has been applied by several European makers. The designer has introduced this additional body curve in order to carry out the streamline effect and at the same time it gives a wide seat and gives the impression of the passengers sitting in the body, scarcely an evidence of the seat formation appearing above the body lines.

All bodies are considerably lower than heretofore, due to dropping the rear end of the frame 4 inches on the large four model 45 and also on the six, whereas on the small four or model 30 this has not been done. On these two models the three-quarter rear springs are now mounted under the axle instead of over it. The forward end of the chassis, by a new design of front axle, is heavily dropped between the steering knuckle and the spring seating, the drop here being so great that in order to give the front end of the crankcase clearance the center of the axle curves slightly forward. The net result is that the frame is less than 25 inches from the ground and yet the mud apron clearance is 10 inches.

Still further has this low streamline effect been accomplished in all models by the lengthening of the wheelbase in all models, thus in the 30 it has been increased from 110 to 115 inches; in the 45 from 124 to 132 3-4; and in the six from 132 to 140 3-4.



On top is shown the seating arrangement in the seven-passenger body and at the bottom the auxiliary seat in White model 30

Several other factors enter into the general body makeup to carry out the conception of the designer. The steering posts are tilted at an angle of 37 instead of 45 degrees and on the runabouts the rake is still further increased to 33 degrees.

The low glass windshield rests directly on the cowl, no filler board being used, and it tilts backwards 2 1-4 inches.

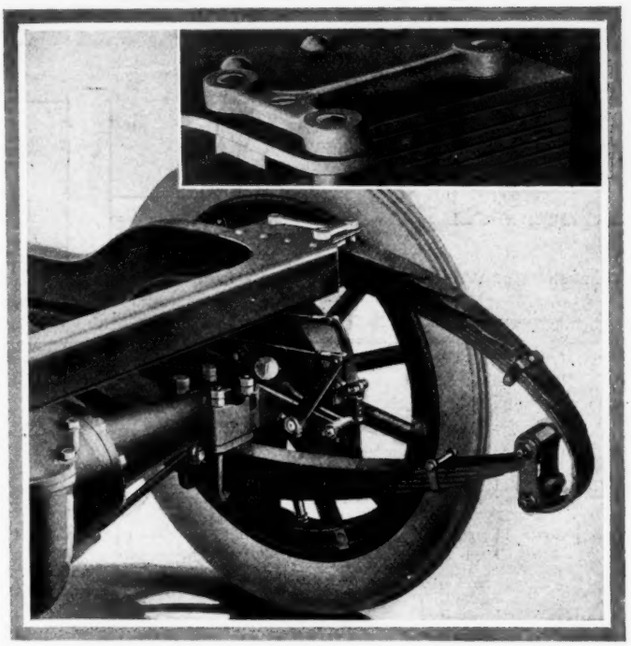
The one-man top equipment, used for the first time, sits inside the body instead of outside of it and its top line is a curve which conforms with the body proportions.

Front and rear fenders are crowned, an innovation with this company, the amount of arch being 2.5 inches for a fender width of 13 inches on the larger models.

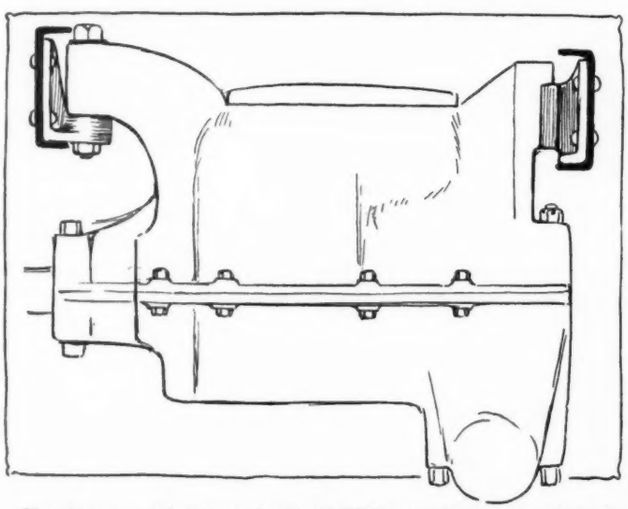
Internally this new line of bodies is replete with improvements, some of which perhaps can be placed in the column of innovations. The upholstery is tufted in parallel ridges in contrast with the diamond pattern; front and rear seat cushions rest on the floor and both are slightly tilted for comfort. To accomplish this the gasoline tank on all models is at the rear and the tool boxes are on either side of the chassis within the apron extending from the frame to the inner edge of the running board, with access to them through small doors.

Low Auxiliary Seats

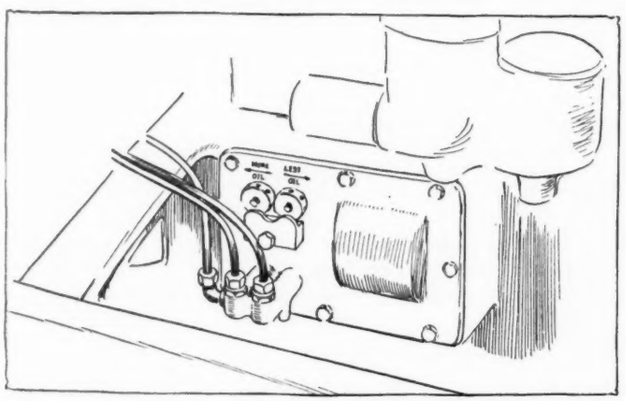
The folding tonneau seats are sunk into the floor 2 3-4 inches so that the passengers on them are on the same level as those on the rear seats instead of being higher. These seats fold forward and rest vertically in a compartment in rear of the front seats. When open, in the sitting position, they are locked by a spring catch. On model 30, a five-passenger car, an extra detachable seat is furnished which allows the passenger sitting sidewise, and this seat folds into a compartment back of the front seats.



On White models 45 and six the three-quarter rear spring is now under the axle and on top the spring attaches to the frame by bolts which can be removed from the under side so as to allow of removing the spring without interfering with the body



Showing support fore and aft of White gearbox on brackets in the frame cross members so that the over-all length of the box will allow of its being lifted directly out or dropped



On the outside of the White crankcase are oil adjustments for the pump. The adjustments are round nuts, which can be turned by a punch for adjustments

No Upholstery above Parapets

Several additional body details deserve noting such as no upholstery appearing above the body lines; in the rear is a new design of trunk rack which can be opened or closed by one movement, either a pull or push; and this rack is supported by the gasoline tank protecting guard, a spring catch holding the rack locked in the closed position. Two spare tires can be carried in the left running board where they are countersunk in the running board and front fender; and beneath the center cowl on the 45 and the six are two package compartments with a clock mounted flush between them. Below these compartments is the space to receive the auxiliary seats.

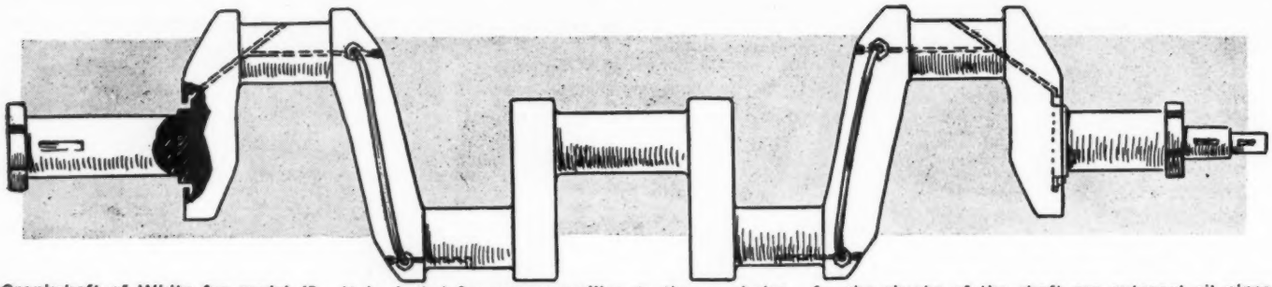
Lastly the staid black has been ruled out of the category of color options furnished as stock, and now the purchaser can take his choice of White special maroon, White special grey, Cleveland grey, Brewster green and Cobalt blue.

Motor Backbone Unaltered

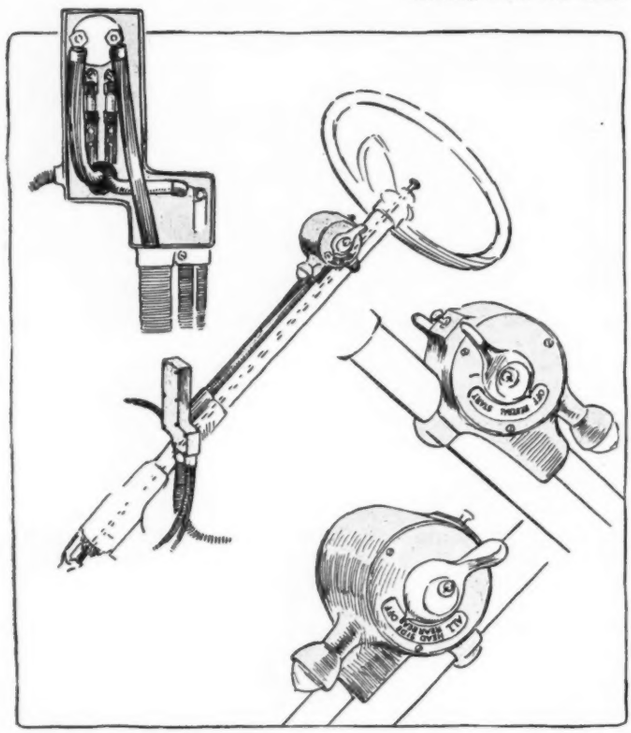
The motors remain practically the same, excepting that many changes have been made in their components. Moving the Entz motor-generator to the rear has advantages. This unit is now driven by silent chain from the flywheel and thence by short shaft with universal joints. In its present position it is immediately ahead of the battery, swung in a cradle from cross members of the frame.

Accessibility Improved

In this new position it leaves the motor more accessible, adds somewhat to the cooling of the motors in that there is less restriction to the air currents and it also takes its drive off the timing gears. It is geared 2.6 to 1 with the crankshaft and the motor-generator unit is 20 pounds lighter than this year. By changing its winding somewhat it has been given



Crankshaft of White for model 45. It is drilled for pressure oiling to the crankpins. On the cheeks of the shaft are external oil pipes leading from the main bearings to the crankpins



Control parts on steering post of 1915 White cars

different electrical characteristics so that it begins charging at a car speed of 7 miles per hour and its maximum charging rate is reduced practically one-third, to avoid overcharging at continuous sustained speeds. There are no current regulating parts inserted between this motor-generator and the battery excepting a small dash indicator to show when it is charging or discharging.

21-Volt Lamps

Twenty-one volt lamps are used throughout in the car, that is for the two headlights, tail, dash and small lights in the headlights. These headlight bulbs are now in multiple, rather than in series so that now if one burns out the opposite one does not go out. The double wire system is used. Wiring in general in the car has been vastly improved, all wires are carried in metal conduits and on the forward side of the dash; immediately above where the steering column pierces it is a junction box containing the fuses.

The oil reservoir has been removed from the engine base and is now a separate compartment on the forward face of the dash below the bonnet. The plunger type of pump remains incorporated within the crankcase at the right rear with external adjustments. The oil is fed to the crankshaft bearings and thence through the drilled crankshaft to the crankpin bearings. Instead of conducting the oil through the long cheeks of the crankshaft between the first and second and third and fourth crankpins use is made of external oil pipes which are outward in order that centrifugal force will be utilized to the greatest extent. A splash level is maintained within the case.

Installing the Stewart vacuum-gravity gasoline feed system brings the fuel to the special vertical tank on the front face of the dash at the right where it is warmed by the motor. From this tank the fuel feeds by gravity. The White carbureter has been generally improved. Using the Stewart gravity system allows of carrying the carbureter higher than formerly. It is now well up on the side of the engine, with a most abbreviated elbow serving as a manifold. This carbureter designed along Claudel-Hobson lines, is without moving parts or springs of any nature.

Arc Clutch Brake

The new form of clutch brake, to prevent clutch spinning when shifting gears is an arc-shaped brake with a fabric facing bearing on a small drum on the clutch shaft. One end of the arc band is hinged to the frame and the other has a linkage with a short arm on the clutch operating shaft.

Another clutch improvement is in the disengaging collar which is now a cone-shaped member against which bear two rollers carried in the bracket on the cross shaft, the rollers being at an angle to bear directly on the cone referred to. Grease cups are provided.

The radius rod construction has been changed and instead of the forward end of these rods attaching to a part of the spring bracket they now have a ball-and-socket connection with a bracket attached to the under side of the frame. They are longer than heretofore and their attachment at the rear to the axle on the 45 and the six is altered, due to the underhung springs. Here the axle pad is extended forward and inwards forming a ball ending which enters the socket in the radius rod, a connection similar to that employed in steering connections.

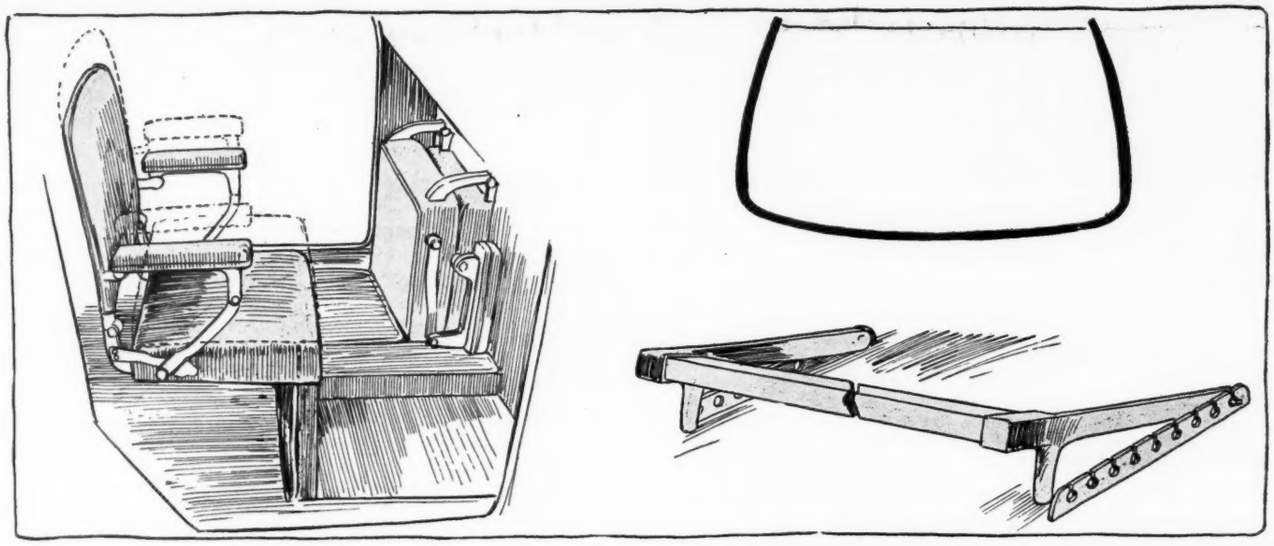
Column Control

In the new system of control parts mounted on the steering column there is on one end a short handle controlling the starter, with three positions, start, neutral and off and on the opposite end a similar handle controlling the various lights and having a position at one end for all the lights being on and an opposite position for all off, with intermediate positions for lights as needed. A Yale lock is in combination with each handle. The under side of this switch cylinder carries a small light which shows on the dash oil gauge and speedometer.

Braking has been improved in that there is now an equalizer in the service brake connections as well as in the emergency ones, heretofore the emergency set being only so provided.

Accessible Springs

An improvement in connection with the rear spring attachment on the 45 and six is that where the spring attaches to the frame there is an extension of the frame cross mem-



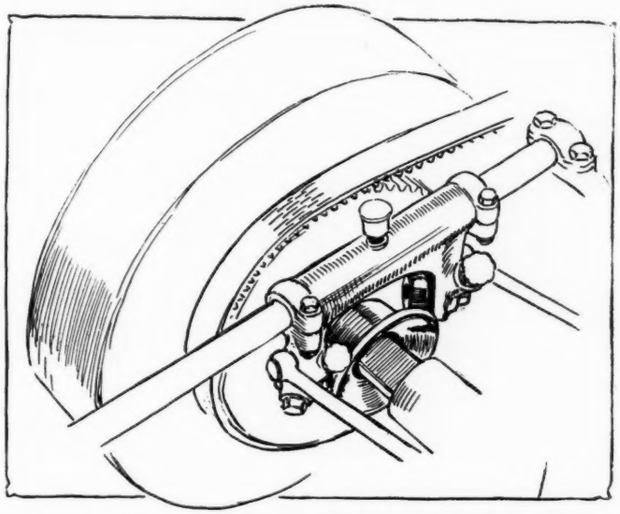
Auxiliary tonneau seats in White, showing them countersunk into floor, and also how they fold into position. On top is cross-section of White body in rear of front seat and underneath adjustable foot rest for tonneau of all models

ber under which the spring fits. The clip bolts thread into this plate and have not nuts on their upper ends, so that now the spring can be removed without having to raise the body to get at the nuts on the clips.

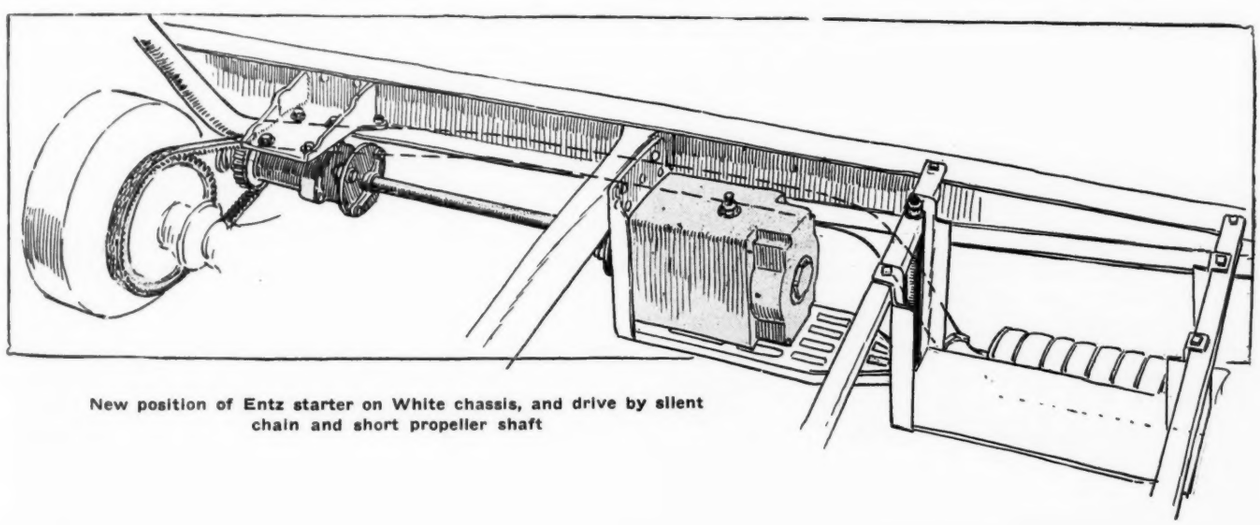
The single ignition system used since its adoption of the gasoline motor is continued, the magneto alone being relied upon. It is entirely separate from the starting and lighting system.

On model 30 are 32 by 4-inch tires in contrast with 34 inches sizes for 1914.

Motor sizes remain as formerly and are: On model 30 they are 3 3-4 by 5 1-8; on model 45 they are 4.25 by 6 3-8; and on the six they are 4.25 by 5.75. The L-type block casting with integral intake, exhaust and water manifolds is continued; valve operating parts are inclosed and the general motor characteristics unaltered excepting as already referred to. The four-speed gearbox, mounted as a separate unit amidship is continued. On model 30 direct is on third with fourth gear a stepped-up indirect. On the other two models fourth is direct. Drive from the gearbox is through a propeller shaft with two universal joints to the White design of axle carrying its two sets of brakes one internal, the other external. Steering is on the left on all models with the gearshift lever in the center for right hand operation and the emergency brake lever at the left for left hand operation. The ball end on the gearshift lever which was standard for 1914 has been discontinued.



White clutch, showing cone-shaped release collar. Another clutch improvement is a new form of clutch brake adopted to prevent the clutch spinning when the driver is shifting gears. The new brake is arc-shaped and is provided with a fabric facing bearing on a small drum on the clutch shaft. One end of the arc band is hinged to the frame and the other has a linkage with a short arm on the clutch-operating shaft. Note the silent chain drive for the Entz motor generator



New position of Entz starter on White chassis, and drive by silent chain and short propeller shaft

The Automobile

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Profits of War

TO this date the American automobile industry is profiting substantially by the European war, careful estimates placing the sale of American motor trucks to belligerent and non-belligerent countries at close to the 3,000 mark. France has been the biggest buyer, taking considerably more than 50 per cent. of this output, and Russia, England, Greece and some other European nations have been making purchases. Those American builders are profiting most who were best ready to take care of immediate shipments, and who were further able to guarantee quick deliveries on large quantities of vehicles.

It is not ethical to refer to business that is thrust into your hand due to the misfortunes of others and no thought of boasting is included herein; but the fact remains that America has had placed squarely in her lap the greatest opportunity in history of demonstrating her wares in the eyes of Europe and the entire world. Heretofore Europe has looked with more or less misgiving on our motor trucks, considering them quite too heavy and falling short in not a few other respects. The necessity brought on by the war is bringing American trucks side by side with those of Europe and the stamina of them will be watched with particular interest during the next 6 months.

America has for years boasted that her passenger cars were built to stand up on rough American roads, facing daily conditions that might test to the death not a few of the European cars. The same has been said about our trucks. The time of test has arrived. It is no silk-stocking test, but the test supreme. If American trucks make good it will be the greatest advertisement that the motor industry in this country has ever received and one which will mean more to the development of that industry than anything heretofore accomplished.

Wear

SOME weeks ago attention was directed through these columns to the vital points in truck construction that foreign buyers took into consideration in making purchases for war purposes.

At that time it was outlined that the ability of the truck to withstand wear was looked upon as one of the cardinal, if not the primary consideration. The truck that would not wear was not considered. Some trucks were passed up because their weight was such that it in itself imposed a needless load on the vehicle, a load which was doing its part to wear out the truck rather than it being worn out by a useful load.

The old story of the chain being as strong as its weakest link is most applicable to this aspect of wear in motor trucks, whether such trucks are intended for war purposes or not. The real strength of the truck is that of its weakest part. Further, the standard of wear in the truck is that of the part that will wear first. It is a poorly balanced truck that has parts placed in one part of it that will wear for 10 years or longer and to put other parts in that will need replacing in 3 months or 6 months at the longest. The truck must be balanced, in a word, the weakest link idea should permeate every part of the vehicle.

In the zone of war activities the truck that for any reason whatsoever drops out of the convoy is a most distressing factor. It is sufficiently bad to have a truck which you are using in your business incapacitated for a day. When it stops you can secure others to do its work or hire horses. In war it is different. The vehicle in the convoy that falls out is generally lost. It is pulled to the roadside, more often into the ditch, in order that the road be left open for the remainder of the convoy and the other arms of the service. If the part worn or broken can be adjusted or replaced in a short period of time there is hope that the vehicle can be saved, but otherwise it becomes one of the many unrepaired and finally abandoned.

Wear, or the ability to wear, is a most important factor in truck life. It is also very important that where parts are subjected to great stresses and wear that adequate provisions be made for the adjustment of them. It is an error in design where such adjustments are overlooked. It is an equal error if accessibility is not a prime consideration in connection with parts subjected to great wear, or in danger of being broken.

Claims $700 Electric Impossible at Present

Animated Discussion of Field for Low-Priced Vehicles Marks Close of E. V. A. A. Convention—Session a Success

PHILADELPHIA, PA., Oct. 24—The closing of the Fifth Annual Convention of the Electric Vehicle Assn. of America was animated by the discussion between electric vehicle manufacturers and central station interests on the possibility of the low-priced electric, namely, a passenger vehicle selling at from $500 to $700 and manufactured in large quantities.

T. L. Jones, a representative of the central station interests in Brooklyn, opened the question in his address when he asked, what was being done to distribute information on electric vehicles throughout the country. "The passenger electric vehicle is too high priced," began Mr. Jones. "The only reason why central station companies are not using such vehicles is the high initial cost. In Detroit every central station salesman uses a gasoline car. If the electric vehicle manufacturers will go to the central station people with a $700 electric car they will get enough orders to make its manufacture possible. Today the electric passenger vehicle is for the luxurious classes. According to the registrations of July 1, 1914, 80 per cent. of the gasoline passenger cars had a selling price under $2,000, whereas 85 per cent. of the passenger electrics sold in excess of this price."

Mr. Jones contended that the sale of electric vehicles must be pushed by those people who profit by the sales, and the four people who profit by the sales are the manufacturers of cars, the manufacturers of batteries, the manufacturers of such accessories as motors, tires, etc., and lastly the central station or electric power producing companies.

Lack of Mileage a Drawback

Mr. Jones believes that the lack of mileage is a drawback to the present extended sale of the electric passenger vehicle. "The maker who says he has a 120-mile car," continued Mr. Jones, "has not such a vehicle. He may have it on a glass road and at a certain temperature, but not under normal traveling conditions. Real facts will be more effective than glaring statements."

Continuing Mr. Jones criticised the battery people on the ground that during the last 2 years there has been little progress made in chemical research, although there has been much progress made in the mechanical details of the battery. He spoke of the work the central station interests are doing in Brooklyn by distributing cards to electric truck makers, which enables them to stop at other depots for a boosting charge and secure same at the regular rate. In Brooklyn they are working to have decorative lamp-posts fitted with charging plugs so that the scope of the electrics can be thereby increased.

The gauntlet hurled into the ring on the $700 electric was immediately taken up by George H. Kelly, of the Baker Motor Vehicle Co., Cleveland, who, voicing the views of a part of the electric vehicle manufacturers, contended that it is practically impossible to build a $700 passenger electric vehicle at the present moment. Mr. Kelly believes there is no demand for such a low-priced vehicle at the present time, but rather that the demand is for a good-looking car with a mileage radius from 70 to 80 for battery charge. With a $700 electric this radius would be approximately 30 miles, and the average speed of the vehicle lower than at present.

Concerning the possibility of central stations buying cheap electrics in large quantities, Mr. Kelly cited an experiment made some years ago in which a canvass was made of practically 1,700 different central station people as to the market for an electric to sell at $1,200 and which would have a good mileage radius as well as an adequate speed. There were not enough prospects coming from the central station people to warrant the necessary expenditure for the production of such a vehicle.

"The low-priced electric," Mr. Kelly went on to state, "is yet in the future, and its coming depends on the 6,000 different central stations in the country. If they can get together and place sufficient orders so that such vehicles can be manufactured on a quantity basis, it will be possible to produce such a car, and not until then."

The discussion pro and con on the $700 electric was continued for some time, in fact it was the major discussion of the convention.

"A further cost in the electric car," said Mr. Kelly, "is the mechanical work that must be looked after and which is not a factor in the low-priced gasoline car. A loss of 1 horsepower in a gasoline car is almost a negligible factor, but is a big factor in an electric. Because of this the cheap electric must be a well-built vehicle eliminating friction losses in order to conserve electric current.

"Two big arguments for electric vehicles are long life and low cost of upkeep, and these cannot be secured with cheap construction. After all, first cost is not the biggest factor, particularly if you are going to pay one-half the original cost for fuel to operate the car with during the first 20,000 miles."

According to J. C. Bartlett, a Philadelphia dealer and garageman who handles electrics, there is not any demand for the cheap electric and it cannot be manufactured and marketed for $700. He referred to certain movements in the electric passenger field some years ago where efforts were made to market vehicles much under the present prices, and that these practically ended in failure. The public demands a luxurious type of car with power and mileage.

—

S.A.E. Standards Committee Meets Nov. 17-19

NEW YORK CITY, Oct. 27—The Standards Committee of the Society of Automobile Engineers will hold a 3-day convention in this city, November 17-19. The meeting will be held in the offices of the association.

Reports of the divisions will be submitted and considered at the meeting which will probably be attended by the entire membership of the Committee, consisting of 142 members.

A brief outline of the work and plans of the different divisions was given in THE AUTOMOBILE for October 1.

—

King Has Eight-Cylinder Car Under $1,500

NEW YORK CITY, Oct. 26—The King Motor Car Co., Detroit, Mich., has announced that it will build an eight-cylinder car for 1915, to sell at something less than $1,500 complete, as a five-passenger vehicle. It will have a conventional type of eight-cylinder V-motor, with an S. A. E. rating of between 40 and 45 horsepower, and with a wheelbase of 113 inches.

It was known some months ago that the King company, as well as several other concerns, was deeply interested in the eight-cylinder movement, and had purchased a well-known make of car using this type of motor. The company is prepared to guarantee deliveries on this model after December 30. Its present four-cylinder car will be continued as a regular stock model.

—

Owen To Develop Weidely Motor

INDIANAPOLIS, IND., Oct. 27—Frank E. Smith, receiver for the Premier Motor Mfg. Co. has been authorized by the U. S. Court to borrow $10,000 to carry on the business under the present receivership and the court has further confirmed the contract which Receiver Smith has made with R. M. Owen, New York City, George A. Weidely, Premier engineer, and H. O. Smith of the Premier company, by which Mr. Owen agrees to spend whatever money is necessary for further experimental work in developing the Weidely motor which the Premier company has been marketing this year. A further part of this contract is that the receiver is to deliver to Messrs. Owen, Weidely and Smith, the patterns and core boxes, of the motor. Still further, according to the contract, the receiver sells certain parts of the motor to these three people and the receiver and his successors in return have the right to use the motor in its present or perfected form.

R. M. Owen, president of the R. M. Owen Co., New York City, and also a stockholder in the Entz Motor Corp., New York City, controls the Entz electric transmission, and it has been known that he has, during the past summer, been developing this transmission and chassis fitted with the Weidely motor.

—

CHICAGO, ILL., Oct. 24—The Stewart-Warner Speedometer Corp., has declared the regular quarterly dividends of 1 3-4 per cent. on the preferred and of 1 1-2 per cent. on the common stocks, both payable November 2. The books closed October 24 and re-open November 2.

Harroun Made Chief

Heads Maxwell Engineers—Redden Leaves Sales Force—Rubber Brisk in London—Monarch Lowers Price

DETROIT, MICH., Oct. 27—Ray Harroun, the racing driver, who designed and built the Maxwell cars which made such a good showing in this year's races, has been made Chief Engineer of the Maxwell Motor Co. The Maxwell engineering department has heretofore been jointly headed by R. E. Benner and Wm. Kelley, the latter having had much to do with the design of the motors. Benner has severed his connection with the company, while Kelley continues as assistant to Harroun. During the last few years Harroun has been active in carburetion, having designed the Harroun kerosene carbureter with which one of the Maxwell racers is equipped.

Another Maxwell change is the resignation of C. F. Redden as general sales manager. C. E. Stebbins, former assistant sales manager, has succeeded him.

DETROIT, MICH., Oct. 26—The Maxwell Motor Co., this city, will have six zones, instead of four, as heretofore. Each zone, or division of territory, will have its own supervisor and one publicity supervisor. The zone supervisors are the direct medium between factory and dealer, while under the supervisor are the district salesmen, acting as his lieutenants.

Good Demand for Rubber in London Market

LONDON, ENGLAND, Oct. 17—It is expected that the price of rubber will be fully maintained at over 50 cents a pound for at least the next 6 months. The requirements of the Allied Armies are sufficient to absorb nearly the whole of the plantation rubber production for that period.

Before long the French and British military authorities will need to refit tires on most of the 250,000 motor transport vehicles said to be in use, and there is also a big demand for waterproof ground sheets for the troops, rubber boots, etc.

At the commencement of the war, Germany made great efforts to secure additional supplies of rubber, but the commodity was declared contraband of war by the British Government, and Great Britain practically controls the plantation rubber industry while the Brazilian shipments of wild rubber are very small at present, owing to the commercial depression in that country.

Monarch Six for 1915 Sells at $1,250

DETROIT, MICH., Oct. 27—The Monarch Motor Car Co. will manufacture a six-cylinder car for 1915 which is on the same lines as the 1914 product but at a lower price. The 1915 car will sell at $1,250 or $150 less than in 1914.

U. S. L. Committee Has 55% of Preferred

BUFFALO, N. Y., Oct. 27—The protective committee of the United States Light and Heating Co. announces that it now has on deposit approximately $1,400,000 par value of the $2,500,000 preferred stock outstanding, which is equal to about 55 per cent. of the issue and expects that within a short time additional deposits will bring the amount up to 75 per cent. So far about $3,500,000 par value of the $14,000,000 common stock outstanding has been deposited, this amount being about 25 per cent. of the junior issue. It is expected that the committee will begin to work out a plan of reorganization and an announcement of some kind on this plan can be expected in the near future.

Voiturette Receiver Not to Sell Cars Separately

DETROIT, MICH., Oct. 26—In THE AUTOMOBILE for October 15, page 738, it was stated in the news item concerning the bankrupt American Voiturette Co., that the 375 finished and unfinished Car-Nation cars will be offered for sale at a uniform price of $250, while the Keeton cars will be offered at $1,000. This information was rather misleading as it was a tentative figure proposed in case there should be a sacrifice sale of the whole lot of cars to one purchaser. It never was the intention of the receiver, the Detroit Trust Co., to have the cars sold individually to the public.

DETROIT, MICH., Oct. 26—A hearing has been set for November 9 in the United States District Court, when Judge Tuttle will decide whether the offer of $100,000 cash made by the Samuel L. Winternitz Co., Chicago, for the property of the American Voiturette Co., exclusive of the real estate, accounts, notes and cash, should be accepted. All creditors should attend the hearing.

De Laski & Thropp Co. Wins Patent Suit

TRENTON, N. J., Oct. 27—The de Laski & Thropp Circular Woven Tire Co., Trenton, N. J., was awarded the decision in the U. S. District Court here last week in its suit against the William R. Thropp & Sons Co., of Trenton. The decision sustains the validity of certain of the claims of United States patent No. 1,011,450, dated December 12, 1911, which covers the tire wrapping machine put out by this company and holds the machines manufactured by the defendant to be infringements.

Attorneys for William R. Thropp & Sons Co. state that an appeal will be filed at once.

New Crow Touring Car Sells at $745

ELKHART, IND., Oct. 26—The Crow Motor Car Co., Elkhart, Ind., has recently completed a five-passenger, 20 horsepower touring car to be sold with full electrical equipment at a list price of not to exceed $745.

This latest addition will be known as the Crow Elk-Hart, Jr. This car has streamline body, oval-front radiator, full-floating rear axle, three-speed selective transmission, dry-plate multiple disk clutch, center control, Gray & Davis electric generator and starter, electric lights and dimmer, 30-inch wheels, 3 1-2-inch tires, 101-inch wheelbase, drop-forged front axle, U-shaped doors and three-point suspension for the motor. The crankcase, water manifolds and gearbox are of aluminum.

The car is finished in navy blue with nickel trimming. It will have excellent upholstering, tilted seats, mohair top, Stewart speedometer and the gasoline tank will be built in the cowl with filler cap under the hood. The clear vision ventilating windshield is an integral part of the body, preventing it from working loose. The back of the front seat will be leather covered. With full equipment this new model weighs 1,575 pounds.

ST. LOUIS, MO., Oct. 24—A bill was passed in the Municipal Assembly here this week giving doctors the right-of-way on public streets with their automobiles and permits them to pass any procession or assemblage in the streets. Previously the fire department equipment, ambulances, U. S. mail wagons, police patrols and street railway repair wagons were the only ones favored by the right-of-way law.

Mirrors on All Motor Trucks in N. J.

NEWARK, N. J., Oct. 27—Beginning with January 1, 1915, all motor trucks in New Jersey must be fitted with mirrors enabling the drivers to see the road back of the truck. The rule was made necessary by the protected position of the driver, who is unable to see behind and to realize when another vehicle passes from the rear.

Crown Co. Officials Indicted for Mail Fraud

LOUISVILLE, KY., Oct. 25—C. H. Lambert, and his son A. B. Lambert, have been indicted in the Federal Court here, being charged with using the United States mail to defraud, the action being in connection with the Crown Motor Car Co., which has recently been succeeded by the Hercules Motor Car Co., with the former concern of which the Lamberts were officers. Yesterday, they made cash bonds of $4,000 each.

The indictments returned at the last term of the Federal Court charged the Lamberts with organizing an automobile company and selling agencies over the country on a basis of $100 deposit each. The Crown company had sold about 400 of those agencies but had not manufactured more than twelve or fifteen cars. Of the 400 agencies so purchased, 100 stopped payment on their checks. Agents were secured for territory in Minnesota, Pennsylvania, Oklahoma, Kansas, Nebraska, Ohio, and other states. For the $100 each agent was given exclusive territory, and also one share of 5 per cent. stock. The deposits were to be returned in credits of $25 each on the first four cars purchased, the indictments charge. Attached to the indictments are letters which show that the dealers were afterwards required to deposit from $50 to $100 as advance freight.

The relationship between the Crown Motor Car Co. and the Hercules Motor Car Co. was as follows: The Crown company was organized in March, 1913, under the laws of South Dakota, with

an organized capital of $500,000 and with B. F. Lambert, president; A. B. Lambert, vice-president, and C. H. Lambert, secretary and treasurer. The place of business was 131 North Third street, Louisville. In April, 1914, the Hercules Motor Car Co. was organized under the laws of South Dakota, with an authorized capital stock of $1,500,000, of which $500,000 was to be preferred stock. Its officers were C. H. Lambert, president; B. F. Lambert, vice-president, and A. B. Lambert, secretary and treasurer. The Hercules company took over all the assets and assumed all the liabilities of the Crown company. The plant and machinery of the Crown company were taken over for a reasonable amount.

The Hercules company invited 300 agents of the Crown company to transfer their contracts to the newly formed Hercules company, which over 200 of them did. Twelve or fifteen Crown models were delivered, and most of the remaining agents, those who had neither received cars nor transferred their accounts, received their money back.

It was after April of this year that several of the dealers who had made the original deposits of $100 and subsequent deposits of $100 for freight, began to complain to the postal authorities. A number of them appeared before the Federal Grand Jury here 2 weeks ago, the result being the indictments on eleven counts under Section 215 of the Penal Code. Each count charges that the Lamberts devised a scheme and artifices to defraud some particular man by fraudulently organizing themselves under the name of the Crown Motor Car Co., etc., etc.

I. C. Soper, auditor of the Hercules company, and also a stockholder, states that the company never refused a single demand for the return of the deposit money and that this money is at present being held and will be returned if cars are not delivered. He says the Hercules company has $10,000 or $12,000 which the Crown company received in deposits and that the dealers who put it up could get it back for the asking. To date the company has only turned out about 100 cars, but expects to turn out thirty-five more within the next 10 days.

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Business Conditions in Italy Are Tranquil

NEW YORK CITY, Oct. 26—The R. I. V. Co., manufacturer of ball bearings, has received information from its factory in Officine de Villar Perosa, Italy. The information states that there is nothing to fear in that country. As to delay in shipping there is nothing to cause any apprehension as long as Italy is keeping its neutrality. Referring to the talk of the disturbing conditions of that country, no weight should be given it. Business is going on as usual. The R. I. V. Co. is receiving an average of one large shipment a week.

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Schrader Opens London Office and Factory

NEW YORK CITY, Oct. 26—A. Schrader's Son, manufacturer of tire valves and tire pressure gauges, will establish a London office and factory. The branch will be at 14-16 Dorset place, London, and will be in charge of W. H. Cole. The machinery and entire equipment has already been shipped and the factory is expected to be in full operation before the end of the month.

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Action Expected Shortly on Ferry Charges

NEW YORK CITY, Oct. 26—To secure official action on the claim that automobiles are discriminated against in connection with ferry charges, the Traffic Department of the National Automobile Chamber of Commerce announces that the matter will be taken up again within another week or so, in conjunction with other automobile associations and the Merchants' Assn. of New York.

When this subject was discussed before Dock Commissioner Smith in July, representatives of the manufacturers, dealers and users of trucks showed that discrimination exists on practically all municipal ferries and railroads, in the rates charged on self-propelling vehicles as compared with horse-drawn vehicles. The railroads asked for time in which to give the matter consideration, check over their schedules and submit new tariffs for consideration. It was expected that this could be done within 60 days. Some delays were encountered, but the automobile and trucking interests are now hopeful of having the matter determined within a short time.

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Stromberg-Equipped Jeffery Makes 28.7 M. P. G.

CHICAGO, ILL., Oct. 27—*Special Telegram*—Under the auspices of the Technical Committee of the Chicago Automobile Club, with Chairman F. E. Edwards in charge and assisted by Harry A. Tarantous of *Motor Age*, a Chesterfield Jeffery six, equipped with a Stromberg carbureter, today covered 28.7 miles on 1 gallon of Red Crown gasoline of 57.5 degrees at 47.5 Fahrenheit, the trip being made over the Chicago boulevards. The car and passengers weighed 4,100 pounds, and the ton mileage was 58.8 ton-miles.

It was a cold day, the temperature being 42 degrees. The speed was from 18 to 22 miles per hour and the clutch was not disengaged during the trip except when necessary because of a stop in the traffic. Following the fuel test and without changing the carbureter adjustments, the car was driven from a standing start to 30 miles per hour in 12 4-5 seconds. Still without change in the carbureter adjustment, the car was driven at 4 miles per hour on high gear and was speeded up to 44 miles per hour. Road conditions would not permit of greater speed. The test finished with a climb up Hubbard's hill. Going through the gears, the car attained a speed of 15 miles an hour in high at the top. Crossing the starting line at 11 miles an hour in high gear the Jeffery was going at 18 miles an hour at the top of the hill.

The test was conducted for the Stromberg Devices Company and the carbureter used was a model H B 1. A Stewart speedometer was used.

—

Federal Truck to Share Profits with Employes

DETROIT, MICH., Oct. 26—The Federal Motor Truck Co., Detroit, will install a profit-sharing plan on January 1, 1915. Every employe was informed that all who were at work on December 31, would receive a share of the profits of the concern. This share was to be equal to 10 per cent. of the worker's yearly salary.

—

Gasoline Drops ½ Cent in Indianapolis

INDIANAPOLIS, IND., Oct. 26—The market price of gasoline has taken another decline at Indianapolis and is now 11 cents. This is a decline of one-half cent a gallon. Dealers who have contracts obtain gasoline at 1-2 cent a gallon off of market price. There has been a total decline in the market price of 3 cents a gallon since January. The retail price remains unchanged at from 13 to 16 cents a gallon.

Market Reports for the Week

The usual changes occurred in this week's markets. Prices were generally steady, but in many cases where the changes occurred, they fluctuated. Antimony this week is in good demand and as a consequence prices are higher by $0.03. This metal gained on an average 1-2 cent per day. Both Bessemer and open-hearth steels dropped $0.50 per ton. Copper is heavier and lower. The capture of three more ships carrying copper from New York City to Europe, apparently for Germany, has had a depressing effect here. The demand on electrolytic copper was light. Tin had a very fluctuating week, its highest price being $31.75 and its lowest price being $1.25 lower. The American October deliveries of tin are expected to be 2,800 to 3,000 tons. Lead is in fair demand and again stronger. The rubber market was very steady. Fine Up-River Para remained constant at $0.66 while tire scrap, which hardly ever changes in price, remained at $0.05. There were no changes in the oils, lubricants and chemical markets. Cottonseed oil, however, dropped $0.35 a barrel.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Changes
Antimony	.10½	.12	.12½	.13	.13	.13½	+.03
Beams & Channels, 100 lbs.	1.26	1.26	1.26	1.26	1.26	1.26	.....
Besemer Steel, ton	19.50	19.50	19.00	19.00	19.00	19.00	—.50
Copper, Elec., lb.	.11 3/20	.11⅛	.11⅛	.11⅛	.11 3/10	.11¼	+.001/10
Copper, Lake, lb.	.11⅜	.11⅜	.11⅝	.11⅜	.11½	.11⅝	+.001/20
Cottonseed Oil, bbl.	5.00	4.90	4.80	4.77	4.60	4.65	—.35
Cyanide Potash, lb.	.25	.25	.25	.25	.25	.25	.....
Fish Oil, Menhaden, Brown	.40	.40	.40	.40	.40	.40	.....
Gasoline, Auto, bbl.	.13	.13	.13	.13	.13	.13	.....
Lard Oil, prime	.92	.92	.91	.91	.90	.90	.....
Lead, 100 lbs.	3.50	3.50	3.50	3.50	3.50	3.50	.....
Linseed Oil	.47	.47	.47	.47	.47	.47	.....
Open-Hearth Steel, ton	19.50	19.50	19.00	19.00	19.00	19.00	—.50
Petroleum, bbl., Kans., crude	1.45	1.45	1.45	1.45	1.45	1.45	.....
Petroleum, bbl., Pa., crude	.55	.55	.55	.55	.55	.55	.....
Rapeseed Oil, refined	.82	.82	.82	.82	.82	.82	.....
Rubber, Fine Up-River, Para	.66	.66	.66	.66	.66	.66	.....
Silk, raw, Ital.	..	4.30	..	..	4.30	4.25	—.05
Silk, raw, Japan	..	3.30	..	..	3.30	3.28	—.02
Sulphuric Acid, 60 Baume	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.	30.50	31.75	31.75	31.50	31.25	30.75	+.25
Tire Scrap	.05	.05	.05	.05	.05	.05	.....

Records Broken at Galesburg Dirt Track

New Marks Set for 50, 75 and 100 Miles—Mulford Wins Century in 1:32:54.5

GALESBURG, ILL., Oct. 23—New dirt track records for 50, 75 and 100 miles were created yesterday in the century race on the local track, promoted by the Galesburg District Fair Assn. Ralph Mulford in a Duesenberg was the winner, but it was an unexpected victory, made possible by Bob Burman running out of gasoline within 1-4 mile of the finish. Burman in his Peugeot had led the field from the 20-mile post, when DePalma was forced to go into dry dock because of dirt clogging the gasoline line. He had driven carefully and fast and no one questioned his victory. In fact it was something like the 1912 race at Indianapolis when DePalma spreadeagled the field. But in the backstretch of the last lap Burman was seen to slow and at the three-quarter pole he was simply rolling along. Mulford had been trailing all the way and was not more than 1-2 mile behind the pacemaker at any stage. So when Burman faltered he was in an excellent position, shooting by the slowing Peugeot and getting the checkered flag first, 10 seconds ahead of Burman, who had enough momentum to coast home from the three-quarter pole.

Five Cars Allowed to Finish

Five cars were permitted to finish. Tom Alley in a Duesenberg was third; Eddie O'Donnell in another Duesenberg was fourth, and J. D. Callaghan in a Keeton was fifth, while Tidmarsh in the Great Western was still running. Those who had docked at the pits included DePalma in the Mercedes six, Gunning in the Fiat Tornado and Rawlings in a Mercer.

Neither Mulford nor Burman made a stop and there were few cases of tire trouble. If Burman knew he was running out of gasoline he could not stop, for Mulford was barking at his heels all the time. Burman was fooled as to his gasoline, for yesterday he used twice as much as he did in the 100-mile race at Kalamazoo.

At the outset it looked like a keen battle, for DePalma, starting in the second row, took the lead immediately, followed by Burman. The pair raced together for 20 miles, with Mulford trailing. Then DePalma had to slow because of the dirt in the gasoline line and at 27 miles he put up at the pits. Working for 15 minutes, he cleaned out the line, then started again in order that the spectators might have some excitement. He started out to catch Burman and turning miles in :53 and :54 he gave a clever exhibition. The lap in which he caught Burman on the far turn was made in :52, DePalma showing his track cunning by holding the pole in a most sensational manner in his swing into the homestretch. A stop for a tire change followed, then DePalma resumed the race but quit a few miles later, when his fuel line again clogged.

One accident marred the race. In his thirty-first lap Jack Gable in the Burman Special turned partly over going into the last turn, caused by a rear wheel collapsing in the backstretch. Gable escaped with a few bruises, but Fritz Walker, his mechanic, was more severely hurt. Walker was taken to the Galesburg hospital.

The track was in perfect condition. Recent rains helped and so did calcium chloride. The course was almost dustless and stood up under the long grind, being really better at the finish than at the start. The weather, too, was ideal, there being no wind. Because of these conditions, it was no wonder records were broken. The 50-mile mark of 46:32, held by Disbrow, was cut to 45:48 by Burman. The 75-mile record of 1:11:21, held by Burman, was dropped to 1:08:54 3-4 by Burman, while Mulford gets the century mark, his 1:32:54 1-2 beating the 1:34:29 4-5, made by Burman at Kalamazoo. This mark is not yet official, however. The time of the race for each 5 miles was as follows:

DISTANCE	TIME	LEADER	DISTANCE	TIME	LEADER
5	4:26½	DePalma	55	50:23½	Burman
10	9:02	DePalma	60	55:01	Burman
15	13:40	DePalma	65	59:40½	Burman
20	18:14	DePalma	70	1:04:15½	Burman
25	22:43½	Burman	75	1:08:54¾	Burman
30	27:17	Burman	80	1:13:41	Burman
35	31:51	Burman	85	1:18:30½	Burman
40	36:31⅛	Burman	90	1:23:17	Burman
45	41:09	Burman	95	1:27:57	Burman
50	45:48	Burman	100	1:32:54½	Mulford

The summary of the race was as follows:

CAR	DRIVER	TIME
Duesenberg	Mulford	1:32:54½
Peugeot	Burman	1:33:08½
Duesenberg	Alley	1:33:37
Duesenberg	O'Donnell	1:37:33
Keeton	Callaghan	1:37:41
Great Western	Tidmarsh	Still running
Mercedes	DePalma	Out
Burman Special	Cable	Out
Fiat Tornado	Gunning	Out
Mercer	Rawlings	Out

The success of the race was such that the Galesburg association is planning something bigger for next year. It is proposed to widen the track, hang up at least a $5,000 purse and stage a 200-mile race about June 15, in between Indianapolis and Sioux City. It is suggested that this be an invitation affair, limited to ten or a dozen cars.

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DETROIT, MICH., Oct. 24—Since April 1, 1914, the Saxon Motor Co., has shipped 6,200 cars of which many went to foreign lands. June was the Saxon's biggest month, 1,787 cars being shipped, while the biggest day was June 22, when 103 cars were shipped.

Duesenberg Breaks Century Mark on Hamline Track

MINNEAPOLIS, MINN., Oct. 24—Tom Alley in a Duesenberg car today established a new dirt track record for 100 miles at Hamline, under adverse conditions. His time was 1:31:30 as against the official time of 1:40:15 made by De Palma in a Mercedes at Brighton Beach on September 2, 1914. He averaged a little over 65 miles an hour. The others who finished were as follows: Mulford, O'Donnell and De Palma.

The race was a Class D, non-stock, free-for-all, flying start and the prizes were as follows, first, $1,000; second, $750; third, $500; fourth, $250; and for breaking the world's record, $1,000.

The race was on a 1-mile dirt track, which was over heavy due to excess of calcium chloride with the addition of rain.

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Big Automobile Representation in Tercentenary

NEW YORK CITY, Oct. 28—Over 1,200 motor vehicles, including passenger cars and commercial trucks, were represented in tonight's celebration of New York's 300th business birthday. The Commercial Tercentenary Celebration, commemorating 300 years of chartered commerce in this country, started on Sunday, October 25, when President Wilson opened the religious feature of the celebration in this city. The motor vehicle pageant, which was held tonight, was composed of floats, automobiles and motorcycles, exclusively. The entrants competed for $5,000 worth of prizes, which were offered by the State and $1,000 additional from other sources.

A reception was given to Governor Glynn and Mayor Mitchell at the Automobile Club of America, both of whom rode at the head of the pageant and reviewed it from the Court of Honor at Forty-second street and Fifth avenue.

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Two Stutz Cars Entered for Corona

CORONA, CAL., Oct. 21—Charles Klein, driver of the King car at Indianapolis and in the motor race meets of the Northwest this summer, has contracted to pilot the second Stutz entered by Walter M. Brown in the Corona road race which is scheduled to take place on the Circle City course, Thanksgiving Day. The third Stutz driver is to be Barney Oldfield, if he gets through the strenuous Los Angeles-to-Phoenix road race safely and with his car in condition to start at Corona.

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Eighteen in Los Angeles-Phoenix Road Race

LOS ANGELES, CAL., Oct. 23—Entries for the seventh annual Los Angeles-Phoenix automobile road race closed yesterday with eighteen cars nominated. The start will be made here on the morning of November 9, with night controls at Needles, Cal., and Prescott, Ariz., and the finish will be at Phoenix, Ariz., on November 11. Two mountain ranges and

the Mojave desert must be crossed. The course will be about 700 miles and state highways will be patrolled by the militia. A diamond medal has been offered for the winner.

The list of cars and drivers follows: Paige, Louis Nikrent; Chevrolet, L. R. Lawrence; Unknown, unknown; Simplex, O. Davis; Stutz, Barney Oldfield; KisselKar, D. Anderson; Maxwell, W. Carlson, Jr.; Paige, T. J. Baudet; Metz, unknown; Kincaid Special, J. Greenwood; Metz, unknown; Buick, H. Ellis; De Dietrich, unknown; Stutz, J. Burns; Thomas, H. J. Pink; Cadillac, W. W. Bramlette.

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100 Models on Display at Los Angeles

LOS ANGELES, CAL., Oct. 17—The annual Los Angeles automobile show opened at the Shrine auditorium this afternoon with more than 100 new models on display, representing twenty-six agencies. The Los Angeles show is the first of the Western season. There were so many machines on the floor that exhibits were staged in the lobby and in private rooms off from the main show room. Accessory exhibits, representing every branch of the industry, have been placed in the balcony.

The second week of the show is to be given over to the motor truck industry. The automobiles are to be taken off the floor by midnight, Friday, October 23, and the following afternoon the truck show will open.

The attendance on opening day broke all records for automobile shows in Southern California.

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Fifty 1915 Models at Madison's Fall Show

MADISON, WIS., Oct. 26—Fifty 1915 models were displayed by Madison, Wis., dealers at the first annual fall automobile show, conducted in connection with Madison's big Fall festival last week. The display occupied a huge tent, there being no building available to house the collection of cars. Among the cars on exhibition were: Buick, Chalmers, Ford, Saxon, Cadillac, Chevrolet, Hudson, White, Studebaker, Premier, KisselKar, Reo, Moline-Knight, Regal, Oakland and Mitchell. As Madison dealers are for the most part large district agents in western Wisconsin, the show attracted sub-dealers as well as retail buyers from a large territory and a splendid business was done. The show will be repeated next fall and will supplant the annual spring show.

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Montreal Show To Be Held Jan. 23-30

MONTREAL, Oct. 22—It has been decided by the Show Committee of the Montreal Automobile Trade Assn. to hold a show from January 23 to 30 inclusive and the same will be held in the Allen Line Liverpool Buildings. This year's show will, as above, be spread over one week only with a special commercial section reserved for trucks, etc. The space at the disposal of exhibitors is 60,000 square feet. Last year's show covered 2 weeks, one for pleasure cars and the other devoted to commercial vehicles.

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Detroit Garagemen Form Welfare Association

DETROIT, MICH., Oct. 24—Garage Owners of Detroit have organized the Detroit Garage and Station Operators Assn., the object of which is to promote the welfare of all connected and interested in the garage business. F. A. Bean, of the Grosse Point Garage, was elected president; J. J. Towers, of the Canfield Garage, vice-president; A. J. Dorsey, of the Indian Village Garage, secretary and Roy L. Francis, of the Central Oil Co., treasurer.

There are several important measures which the association is now working up, such as a state garage lien law, revision of the insurance rates which now make no differences between a fireproof garage and a woodshed used as garage in an alley; improve the matter of selling gasoline which now leaves only 1 cent profit per gallon; establishment of an employment bureau and a workable credit system. A state convention will be held in Detroit during the local automobile show.

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Illinois Garagemen Condemn "Leagues"

PEORIA, ILL., Oct. 24—The ease with which differences between the retail and manufacturing ends of the automobile trade may be adjusted, provided one or both sides are organized, was demonstrated today at the fall convention of the Garage Owners' Assn. of Illinois. The garagemen are well organized, and the Danville members had complained that a salaried salesman of a manufacturer was conducting a cut-price "curbstone" business in that town to the detriment of the dealer-garagemen. The matter was referred to the state association by the Danville garagemen with the result that, after correspondence, the manufacturer recalled the salesman and appointed dealers in the territory. The Danville garagemen-dealers also suggested that any further matter of price-cutting might be adjusted by consultation with the manufacturer.

The seventy-five delegates convened at 2:30 o'clock yesterday afternoon and the convention ended tonight with a banquet and ball in the Jefferson Hotel. About seventy-five delegates and as many more non-delegates were present. A theater party, luncheon, the banquet and ball and a tour of the town were mingled with the business sessions.

Motorists' "leagues," which generally are formed for the purpose of supplying car owners with supplies and accessories at cut rates, were placed under the ban. The garagemen consider that the sale of supplies is a business which belongs to the garageman, and the body went on record against the "leagues" by a resolution.

In their work to benefit themselves by rendering greater service to their clientèle the garagemen considered a plan whereby a certain Chicago manufacturer will sell them supplies at about half their present price. The alliance between the garage and the factory involves an investment by the association members and the restriction of trade to members.

The Illinois association, which has been laboring for a national organization, made its call official by passing a resolution; organization work is now going on in the East and the national meeting will be held in January in Chicago during the automobile show.

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Truck Club Discusses War Trucks

NEW YORK CITY, Oct. 27—"The Use of Motor Vehicles in the European War" was the subject of the evening at the regular monthly meeting of the New York section of the Motor Truck Club of America, held on October 21, at the Automobile Club of America. The speaker was John R. Eustis, of *The Evening Mail*, who also showed thirty-six lantern slides depicting the different types of motor vehicles used and the various ways in which they were adapted to the special requirements of military service.

Commenting further on the use of motor vehicles in war, he stated that the English were the first to make use of this means of transportation, having used steam traction trucks in the South African campaign.

The next meeting of the club will be held on November 18 at the Automobile Club of America.

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PHILADELPHIA, PA., Oct. 24—C. C. Partin, manager of the division of motor truck research of the Curtis Publishing Co., was the principal speaker of the monthly dinner and business meeting of the Motor Truck Assn., this city, held this week. His address dwelt on the necessity of advertising. In regard to establishing the reputation of a truck, he stated that oftentimes a truck of unknown rating is regarded with suspicion, and should one of this class be installed, there is a constant protest against repair expenditures, it being believed that these could have been avoided with the right kind of machine, whereas a truck of nation-wide repute carries with it the equally well-known fact that such outlays are unavoidable.

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Mitchell Finishes 7,500-Mile Sealed-Bonnet Run

PITTSBURGH, PA., Oct. 23—The Mitchell car which started from Chicago, Ill., on September 23, with its bonnet sealed, arrived in this city today, after traveling 7,518.4 miles, its seals still intact. The car touched twenty-three states and Washington, D. C., en route.

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Grossman Buys Windshield Cleaner Patent

NEW YORK CITY, Oct. 28—The Emil Grossman Mfg. Co., Inc., Brooklyn, has purchased patent No. 1,112,793 for the Security Windshield cleaner, issued to C. J. Heineman, May 11, 1914, as well as his entire right and interest in the invention.

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Lincoln Highway Route Three-Quarters Marked

NEW YORK CITY, Oct. 26—Reports received at the headquarters of the Lincoln Highway Assn., indicate that at least 2,700 miles of the route will be marked by the end of the first year's work on October 31. Indications are that by the spring of 1915 the entire distance of 3,400 miles will be completely marked with at least five markers to the mile.

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CHICAGO, ILL., Oct. 28—Mercedes Fritz Walker, mechanic for Jack Gable in the 100-mile race at the Galesburg track last week, died this morning in the Galesburg hospital as a result of injuries received when Gable's car partly overturned in the 31st lap.

DODGE Additions Worth $650,000—Dodge Bros., Detroit, Mich., manufacturers of the "unknown" car, are still expanding their already large plant. A new pressed-steel shop and the doubling of their general offices have been let to the contractors and will mean a total outlay of $650,000. The pressed-steel plant will a four-story building, 400 feet long and 77 feet wide, which will have a total floor area of 130,000 square feet. It will be connected with the new assembling plant through an extension of the latter building by 189 feet. A wing will also be built 89 feet long and 77 feet wide, to connect it with the loading platform, railroad tracks and driveways. The first two stories will be of steel frame and concrete throughout, while the two other stories will be of reinforced concrete. The exterior will be similar in construction and design and color to the other Dodge buildings. The general office and administration building, which now is a two-story structure, 116 feet by 52 feet, will be enlarged to be a four-story building, 320 feet long and 72 feet wide.

New Plant for Detroit—American Auto Trimmings Co., Detroit, Mich., will build a four-story brick and steel manufacturing plant, estimated cost $36,500.

Alpha Seeking Plant Location—The Alpha Mfg. Co., Bucyrus, O., manufacturer of a line of pumps, is seeking a location to establish a plant in that city.

Endurance Tire's New Brunswick Plant—The Endurance Tire & Rubber Co., New York City, will build a factory 80 by 250 feet, one story, of brick construction, at New Brunswick, N. J., to cost $50,000.

Automobile Factory in Spencer—The Spencer Mfg. Co., Spencer, O., has been incorporated with $50,000 capital stock. It is reported that it will erect a plant for manufacturing automobiles.

Homer Co. to Build Trucks—The directors of the Homer Motor Co., Los Angeles, Cal., have set aside $65,000 for the erection of a factory that will have a capacity of twenty-four motor trucks a month.

Top Co. to Build—The Topford Detachable Limousine Co., Hempstead, L. I., N. Y., will establish a plant for the manufacture of detachable automobile bodies and limousine tops, doors, etc., and general automobile accessories. The estimated cost is $50,000. J. A. MacAvoy and W. Hutchinson, Hempstead, L. I., are interested.

Ford's New L. I. Plant—Ground has been broken for a new eight-story building of concrete, steel and brick construction for the Ford Motor Co., at Honeywell street and Jackson avenue, Long Island City, east of and adjoining its present building. The new building will have a frontage on Jackson avenue of 325 feet and will cost about $650,000.

Triple Action Spring Adding—The Triple Action Spring Co., Chicago, Ill., manufacturer of the Johnson shock absorbers, is making big additions to its factory, located in East Twenty-eighth street, near Michigan avenue. The new plant when completed will occupy 29,000 square feet of floor space, which will enable the company to double the output.

Canadian Battery Co. Adds—The Canadian Hart Accumulator Co., St. John, N. B., is erecting a large factory there for the manufacture of storage batteries. The company will manufacture a complete line of sulphuric acid batteries and all types of plates on the same principles as the batteries made in Great Britain. C. W. Knighton is the Canadian manager.

Spring City Foundry Adding—The Spring City Foundry Co., Waukesha, Wis., established about 2 years ago, and now supplying several important motor and automobile interests in the Middle West with cylinder and engine castings, is making plans for the erection of an addition which will double its foundry capacity. The addition will be 60 by 122 feet in size and will be equipped principally for making grey iron castings for automobile cylinders and other cast-iron parts.

Blood Bros. May Move—The Blood Bros. Machine Co. may remove from Kalamazoo to Allegan, Mich. It is not yet decided, but at a meeting between members of the local Board of Trade and other citizens and Vice-President Howard E. Blood, of the Blood concern, it became known that if a site and a building is furnished and if a certain amount of stock of the company taken by local people, that the chances are Allegan will have the automobile concern. The Blood company would keep the Kalamazoo plant for the manufacturing of its universal joints and other parts, while the Cornelian light car would be made in Allegan.

Nyberg May Build in Fort Smith—E. R. Call, of the Nyberg Automobile Mfg. Co., Anderson, Ind., recently stated to the Business Men's Club of Fort Smith, Ark., that his company had expressed a willingness to locate in that city. He also stated that a company had been organized for the taking over of the Nyberg Automobile Mfg. Co. and that company in reorganizing had looked over the situation and decided upon a Southwestern location, Fort Smith being one of the towns picked out. In mentioning the reasons for this location he stated that four-fifths of the cars sold by the company were south of St. Louis and Kansas City. If the company decides to build in Fort Smith, a factory with a floor space of 40,000 square feet, a capacity for 200 skilled mechanics and an output of 1,200 cars a year, will be erected.

The Automobile Calendar

Oct. 17-Nov. 1....Dallas, Tex., Show, State Fair Grounds, Dallas Automobile Dealers' Assn.
Oct. 28-31.....Milwaukee, Wis., Convention, Northwestern Road Congress, Auditorium.
Nov. 2-6.....Boston, Mass., Salon, Copley Plaza Hotel.
Nov. 3.....Long Island A. C. Century Run.
Nov. 7-8-9.....Los Angeles, Cal., Los Angeles-Phoenix Road Race, Maricopa Auto Club.
Nov. 8.....Philadelphia, Pa., Fletcher Cup Run, Automobile Club of Philadelphia.
Nov. 8-9.....El Paso, Tex., El Paso-Phoenix Road Race, El Paso Auto Club.
Nov. 8-11.....Shreveport, La., Track Meet, Shreveport Auto Club.
Nov. 12.....Phoenix, Ariz., Track Race, Maricopa Auto Club.
Nov. 17-18-19....Harrisburg, Pa., Second Conference of Pa. Industrial Welfare and Efficiency, State Capitol.
Nov. 26.....Corona, Cal., Road Race, Corona Auto Assn.
Dec. 1-4.....New York City, Annual Meeting of the American Society of Mechanical Engineers.
Dec. 12-19.....Akron, O., Show, Akron Auto Show Co., O'Neill Bldg.
Jan. 2-9.....New York City, Annual Automobile Show, Grand Central Palace.
Jan. 3-10.....Buenos-Aires, Argentina, Grand Prize of Argentina.
Jan. 9-16.....Philadelphia Show.
Jan. 11-16.....Buffalo, N. Y., Show, Broadway Auditorium, Automobile Club of America.
Jan. 23-30.....Chicago, Ill., Automobile Show, First Regiment Armory.
Jan. 23-30.....Montreal, Que., Show, Allen Line Liverpool Bldgs., Montreal Automobile Trade Assn., T. C. Kirby, Mgr.
Jan. 30-Feb. 6....Minneapolis, Minn., Show, National Guard Armory, Minneapolis Automobile Trade Assn.
Feb.....Portland, Ore., Show, Portland Auto. Trade Assn.
Feb. 15-20.....Omaha, Neb., Show, Auditorium, C. G. Powell.
Feb. 22.....San Francisco, Cal., Vanderbilt Cup Race, Panama-Pacific Exposition Grounds; Promoter, Panama-Pacific Exposition Co.
Feb. 23-27.....Syracuse, N. Y., Show, Syracuse Auto. Dealers' Assn.; H. T. Gardner, Mgr.
Mar. 6-13.....Boston, Mass., Show, Mechanics Bldg., Boston Auto Dealers Assn., Boston Commercial Motor Veh. Assn.
Mar. 7.....San Francisco, Cal., Panama-Pacific Exposition, Grand Prize Race, Panama-Pacific Exposition Grounds; Promoter, Panama-Pacific Exposition Co.
Mar. 9-15.....Des Moines, Ia., Show, C. G. Van Vliet.
Mar. 14.....San Francisco, Cal., Panama-Pacific Cup Race, Panama-Pacific Exposition Grounds; Promoter, Panama-Pacific Exposition Co.

The Week in the Industry

Motor Men in New Roles

McGUIRE Oldsmobile Advertising Manager—C. V. McGuire, until recently in charge of the publicity department of the Lozier Motor Co., Detroit, and previous to that connected with the advertising departments of the Paige-Detroit Motor Car Co. and the United States Tire Co., has been appointed advertising manager of the Olds Motor Works, Lansing, Mich.

Scott Resigns—Emmet Scott has resigned the treasurership of the M. Rumely Co., Laporte, Ind., effective October 31, so he can devote more time to his own affairs.

Quimby Resigns—E. F. Quimby has resigned from the position of secretary and general manager of the Colfax Mfg. Co., South Bend, Ind., and has been succeeded by S. P. Colby.

Coler Resigns from Overland—Ernest Coler has resigned as advertising manager of the Willys-Overland Co., Toledo, O., to take a similar position with the Briscoe Motors Co., Jackson, Mich.

Estep Joins Cheltenham Press—E. Ralph Estep, former advertising manager of the Packard Motor Car Co., Detroit, Mich., has joined the Cheltenham Press, an advertising agency in New York City, in which he now has a stockholding interest.

Hole Promoted—F. H. Hole, manager of the St. Louis branch of the H. E. Wilcox Motor Co., has been promoted to an executive position with the company at Minneapolis. He was succeeded by J. E. Westrich, who has been the company's service agent.

Milwaukee's Former Mayor Manager—S. M. Becker, formerly mayor of Milwaukee, Wis., has taken the position of manager of the electric vehicle department of the Jesse A. Smith Automobile Co., that city, and will handle Milwaukee and the vicinity in behalf of the Detroit electric.

Rand Simplex Branch Manager—C. D. Rand, who was assistant manager under Bert Latham, has just been appointed branch manager of the Simplex Mercer Pacific Coast agency in San Francisco. Mr. Rand has been connected with the agency ever since its establishment in San Francisco.

Horning to Open Consultation Bureau—W. R. Horning, 1408 West Third street, Cleveland, O., will in the near future establish a service station and consultation bureau on all makes of automobile starting and lighting systems. This station will be opened about November 15 at 1020-1030 Chestnut street, that city.

Pelletier and Tripp Form Advertising Co.—The advertising firm of Pelletier-Tripp, Inc., has been formed in Detroit, Mich., by E. LeRoy Pelletier and William Tripp. Headquarters have been secured in the Fine Arts Bldg. The accounts of several of the big automobile manufacturers have been secured by the corporation. Both men are well known in the automobile, parts and accessory industry of the country. Roy Pelletier has successfully handled the advertising of the Ford, Maxwell, Flanders and Lozier companies. William Tripp has been for many years with the advertising department of the Class Journal Co.

Chapin to Be a Benedict—Cards have just been issued for the wedding of R. D. Chapin, president of the Hudson Motor Car Co., Detroit, Mich., to Miss Inez Tiedeman at St. John's Church, Savannah, on November 4. The bride-to-be is the daughter of Mayor Tiedeman, who was a member of the Savannah Automobile Club's race committee during the Grand Prize and Vanderbilt Cup races.

Wallis Resigns from J. I. C.—H. M. Wallis, Jr., secretary and treasurer of the J. I. Case Plow Works, Racine, Wis., for a number of years, has resigned these positions and retired as a director to be able to devote his entire time and attention to the development of the Wallis Tractor Co., which he organized about 18 months ago, and which now is manufacturing Wallis tractors at Cleveland, O. Mr. Wallis' father, H. M. Wallis, Sr., continues as president of the plow company, which at various times has been interested in the motor car industry, principally as state and territorial agent and distributor for pleasure cars.

Recent Changes on Pacific Coast—D. A. Outcault, a member of the Tacoma Speedway Assn., has been elected president of the Tacoma Automobile Club, and E. B. King succeeds Mr. Outcault as vice-president. The organization of the De Vaux Motor Sales Co., a Los Angeles corporation, has been completed with E. J. Bennett as sales manager. The Grant car now has a new home in Seattle with the Grant Motor Agency, which is established in new quarters at 1026 East Pike street. F. W. Blair is manager of the agency, and associated with him is F. W. Venable. A. C. Stevens, for 2½ years with the Winton Motor Car Co. in Seattle, has been appointed manager of the Winton branch in Portland, Ore., succeeding Bert Roberts, and T. A. Crisman, formerly of the Blaine Auto Co., of Iowa, has joined the sales force of the Hodgins-Fosdick Co. in Spokane, Wash.

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Garage and Dealers' Field

Jandorf's New Lease—The Jandorf Automobile Co., New York City, has leased the second and third floors in 351-355 West Fifty-second street, that city.

Ford's New Bronx Lease—The Ford Motor Co., Detroit, Mich., has leased the six-story building at 607-609 Bergen avenue, Bronx, New York City. This building is 50 by 100 feet in size.

Saxon Now a Branch—The Saxon Motor Co. has been formed in Boston, Mass., to handle the Saxon cars in that territory as a factory branch, instead of an agency and salesrooms have been secured at 620 Commonwealth avenue, with F. S. Sumner as manager.

Houpt's New Repair Station—Harry S. Houpt, Inc., agent for the Mitchell car, has leased property at the northwest corner of Forty-seventh street and Eleventh avenue, New York City, or 645 to 651 Eleventh avenue, to be used as a storehouse and repair station.

G. M. C. Makes a Move—The Boston branch of the General Motors Truck Co. is now housed in one building, the salesrooms on Boylston street having been discontinued, the offices being moved to the service station at 944 Massachusetts avenue, where everything is under one roof.

Ford to Have Retail Branch—The Ford Motor Co. has leased quarters on Boylston street, Boston, Mass., formerly used by the Alco forces, where it will establish a retail branch to be run in connection with its wholesale distributing plant in Cambridge, Mass.

Assn. Plans Own Garage—The Automobile Owners' Assn., Grand Rapids, Mich., is planning to have a garage, service station, supply and accessories department and vulcanizing station of its own. It is estimated there would be a saving of at least 50 per cent. on automobile supplies alone.

Dayton Wants Fire Apparatus—The announcement is made by City Manager Waite of Dayton, O., that bids for a number of pieces of motor-driven fire apparatus will be advertised for in the near future. The city proposes to purchase a chemical arial truck, a tractor, a service truck and a runabout.

Akron Agencies Under One Roof—Plans have been prepared for the erection of a $75,000 building at the corner of Water and Bowers streets, Akron, O., which will be devoted exclusively to sales agencies for automobiles. It is planned to house many of the agencies of the city in the building. The basement will be used as a workshop and the upper floors for showrooms.

Lincoln Highway Emblem on Motometer—The MotoMeter Co., New York City, maker of the Boyce motometer, was licensed by the Lincoln Highway Assn. to the exclusive right to use the Lincoln highway emblem on radiator heat indicators. No additional charge will be made for motometers supplied with this emblem, but it is understood that for each Lincoln highway motometer sold that company has agreed to contribute a certain amount to the Lincoln highway cause.

Bosch Adds New Stations—The Bosch Magneto Co., New York City, has recently added the following supply stations: Olympia Auto Supply Co., Olympia, Wash.; Max Gottberg Auto Co., Columbus, Neb.; James Auto Co., Ogden, Utah; I. P. Todd, Circleville, O.; G. O. Reynolds, Inc., New Rochelle, N. Y.; Marksheffel Motor Co., Colorado Springs, Col.; Eleventh Avenue Garage, Altoona, Pa.; Graham-Seltzer Co., Peoria, Ill.; North West Garage, Cherokee, Iowa; Union Garage, Lansing, Mich.; Plank & Morgan, Worcester, Mass.; Crater Lake Motor Car Co., Medford, Ore.; T. A. Bryson, Savannah, Ga.; Pendleton Auto Co., Pendleton, Ore.; Clyde Garage, Charleston, S. C.; Milton Garage, Milton, Ore.; Motor Car Supply House, Decatur, Ill., and Triple Star Garage, Kahoka, Mo

Automobile Agencies Recently Established

PASSENGER CARS

New York

New York City	Oldsmobile	Oldsmobile Co. of N. Y.
Olcott Beach	Oldsmobile	W. F. Kruger
Rochester	Oldsmobile	George W. Henner
Schuylerville	Oldsmobile	Ford Garage Co., Inc.
Syracuse	Oldsmobile	Wright Bros.
Troy	Herff-Brooks	East Side Garage
Troy	Oldsmobile	Ilium Garage
Utica	Oldsmobile	Utica Regal Sales Co.
Washingtonville	Oldsmobile	Nicoll's Garage

North Carolina

Asheville	Oldsmobile	D. C. Shaw Motor Co.
Greensboro	Oldsmobile	Guilford Motor Car Co.
Rocky Mount	Oldsmobile	Oldsmobile Sales Co.

Ohio

Akron	Oldsmobile	Middlebury Auto Garage
Alliance	Oldsmobile	George H. Judd
Bristolville	Oldsmobile	Miller & Dilley
Cadiz	Oldsmobile	J. W. Robertson
Cambridge	Oldsmobile	Cambridge Motor & Storage Co.
Canton	Oldsmobile	Canton Buggy Co.
Cincinnati	Herff-Brooks	Herff-Brooks Sales Co.
Cleveland	Oldsmobile	Windermore Euclid Garage
Cleveland	Haynes	Cleveland Motor Sales Co.
Columbus	Inter-State	Twyman Motor Car Co.
Eaton	Saxon	E. C. Wysong
E. Liverpool	Oldsmobile	Lincoln Motor Car Co.
Fremont	Krit	John P. Smola
Fostoria	Herff-Brooks	A. C. Ash & Son
Greenville	Oldsmobile	Central Auto Co.
Huron	Oldsmobile	C. E. Rhinemiller
Kenton	Oldsmobile	Arnett Auto Co.
Lima	Oldsmobile	W. E. Rudy
Logan	Ford	C. R. Lutz
Mansfield	Oldsmobile	Pat Gatton & Son
Marietta	Chalmers	Marietta Motor Car Co.
Marseilles	Saxon	M. R. Emptage
Medina	Oldsmobile	Western Reserve Garage
Newark	Oldsmobile	Fred W. Simpson
Norwalk	Oldsmobile	H. C. Newman
Toledo	Oldsmobile	Bunnell Auto Sales Co.
Woodsfield	Oldsmobile	Troutman Garage
Wooster	Oldsmobile	Warren Garage
Youngstown	Herff-Brooks	Cartercar Sales Co.
Youngstown	Oldsmobile	Youngstown Auto & Repair Co.

Oregon

Pendleton	Oldsmobile	B. F. Trombley
Portland	Oldsmobile	Gerlinger Motor Car Co.

Pennsylvania

Allentown	Oldsmobile	Berwin Auto Co.
Braddock	Oldsmobile	Copeland Garage
Chester	Oldsmobile	The Palace Garage
Columbus	Herff-Brooks	Scholton & Fuller
Easton	Oldsmobile	G. Russell King
Emporium	Oldsmobile	Emporium Machine Co.
Greencastle	Saxon	L. H. Leiter Bros.
Harrisburg	Oldsmobile	East End Automobile Co.
Hazleton	Oldsmobile	Hazleton Motor Service Co.
Houtzdale	Oldsmobile	H. J. Wagner
Lancaster	Oldsmobile	Geo. W. Croswell
Lonsdale	Oldsmobile	Heebner-Feiver Motor Co.
Meyersdale	Oldsmobile	Keystone Garage
Norristown	Oldsmobile	Keystone Garage
Oil City	Oldsmobile	C. H. Weaver
Penn Argyl	Oldsmobile	Joel F. Batt
Philadelphia	Oldsmobile	Oldsmobile Co.
Pittsburgh	Oldsmobile	Oldsmobile Co. of Pittsburgh
Pottstown	Oldsmobile	Wm. P. Young & Son
St. Mary's	Franklin	Elk Engineering Works
Sharon	Oldsmobile	Greer Auto Co.
Washington	Oldsmobile	Washington Automobile Co.
W. Newton	Oldsmobile	McKenery & Britton
York	Oldsmobile	J. P. Oden Auto Sales Co.

Rhode Island

Arctic	Oldsmobile	B. F. Tefft, Jr.
Pawtucket	Oldsmobile	James A. Welch
Providence	Herff-Brooks	Jos. A. Pigeon
Woonsocket	Herff-Brooks	Fuller Bros.
Woonsocket	Oldsmobile	H. F. Burdick

South Carolina

Charleston	Oldsmobile	N. B. Paine

Tennessee

Knoxville	Oldsmobile	Cadillac Sales Co.
Nashville	Oldsmobile	Hager Motor Car Co.

Texas

Amarillo	Oldsmobile	Frank W. Hays
El Paso	Oldsmobile	Western Hardware Co.
Marfa	Oldsmobile	D. C. Wease
Pecos	Oldsmobile	Landrum & Lynch
Port Arthur	Saxon	Linn & Smith
Wichita Falls	Oldsmobile	Motor Supply Co.

Utah

Ogden	Oldsmobile	James Automobile Co.
Salt Lake City	Oldsmobile	Randall-Doff Auto Co. Ltd.

Vermont

Brattleboro	Oldsmobile	Mosher & Tucker
Burlington	Oldsmobile	P. T. Donovan
Northfield	Oldsmobile	Cross Bros. Co.

Virginia

Lynchburg	Saxon	Piedmont Motor Co.
Norfolk	Oldsmobile	H. S. Meyers
Parksley	Oldsmobile	Parksley Automobile Co.

Washington

Aberdeen	Oldsmobile	L. A. Poulson
Bellingham	Oldsmobile	A. Burgess
Ellensburg	Oldsmobile	A. M. Wright & W. C. Wescott
Everett	Oldsmobile	L. S. Cannon & S. F. Sherrod
Seattle	Oldsmobile	Gerlinger Motor Car Co.
Tacoma	Oldsmobile	E. H. McClellan

West Virginia

Glen Jean	Herff-Brooks	Robt. Essex

Wisconsin

Brodhead	Herff-Brooks	Fleek & Knozel
Fond Du Lac	Oldsmobile	John D. Giddings
La Crosse	Oldsmobile	Moll-Savage Motor Co.
Madison	Cole	R. A. Warner
Milwaukee	Dodge	Edwards Motor Car Co.
Milwaukee	Oldsmobile	Emil Estberg
Milwaukee	Overland	Geo. W. Browne
Platteville	Saxon	Udelhoven Motor Co.
Prairie du Chien	Saxon	The Harrison Auto Co.
Waukesha	Oldsmobile	R. E. Knowlton

Wyoming

Casper	Oldsmobile	Earl C. Boyle

COMMERCIAL VEHICLES

Pennsylvania

Lancaster	Koehler	J. M. Binkley

Tennessee

Chattanooga	Koehler	Ford Sales Co.
Nashville	Koehler	West H. Morton
Springfield	Koehler	J. D. Traughber

Recent Incorporations in the Automobile Field

Arkansas

ARGENTA—W. F. Brawley Motor Co.; capital, $10,000. Incorporators: W. F. Brawley, John D. Staples and W. R. Deen.

Canada

TORONTO, ONT.—Canadian Simplex Motors; capital, $40,000.

Indiana

INDIANAPOLIS—Higgins-Craig Co.; capital, $20,000; to deal in motor cars. Incorporators: George W. Higgins, J. R. Craig and William R. Higgins.

INDIANAPOLIS—Perfection Spring Wheel Co.; capital, $50,000; to manufacture wheels. Incorporators: Harry Weill, Max Weill and George V. Stein, all of Indianapolis; Austin Cabel and Bret Cabel, both of Washington, Ind.

New York

BROOKLYN—Schroeder-Peters Corp'n.; capital, $20,000; to manufacture engines, motor vehicles, operate a machine shop, etc. Incorporators: Arthur A. Schroeder, 346 Avenue O; Cuyler Heath, 172 Halsey street; Frank R. Greene, 27 Grace court.

HIGHLAND—Howard W. Bloomer, Incorporated; capital, $10,000; motor car business. Incorporators: Howard Bloomer, Highland; Raymond C. Bloomer, 96 Washington street, Poughkeepsie; Charles H. Buys, Jr., Cannon street, Poughkeepsie.

NEW YORK—Economy Parts Co.; capital, $1,000; to manufacture parts for motor cars, motorcycles, etc. Incorporators: George K. Erb, Asbury Park, N. J.; Alan D. Morrow, 220 Broadway; J. Wallace Mahlstadt, 2766 Boulevard, Jersey City, N. J.

NEW YORK—Sole Distributing Co.; capital, $15,000; to conduct a motor car business. Incorporators: Nancy Stamm, 1476 Seabury place, Bronx; Lida S. Davies, 590 W. 172d street; Herman P. Lowenstern, 501 East 140th street.

YONKERS—R. U. Bunker Engineering Co.; capital, $20,000; motor car engineering and designing, motor car parts, etc. Incorporators: Raymond U. Bunker, No. Broadway; David H. Well, Flushing; George O. Elmore, Brick Church, East Orange, N. J.

North Dakota

HEBRON—Hebron Motor Co.; capital, $10,000. Incorporators: Theodore J. Bolke, Charles W. Lorenz and Fred Braun, Jr., all of Hebron.

Ohio

CLEVELAND—Neighbors Motor Co.; capital, $10,000; to deal in motor cars. Incorporators: W. C. Barger, M. T. Flanagan, R. Hall, Robert Jamison and Richard Inglis.

LIMA—Buckeye Machinery Co.; capital, $50,000; to manufacture gas engines and other machinery. Incorporators: Edward E. Welswander, Calvin Welswander, Jacob A. Welswander, George A. Hevrett and Daniel Armentrout.

Oklahoma

BROKEN ARROW—F. O. B. Automobile Co.; capital, $1,000; to deal in motor cars. Incorporators: R. R. Hord, H. C. Hunsecker and L. F. Copeland, all of Broken Arrow.

Tennessee

MEMPHIS—Atlas Machine & Garage Co.; capital, $2,000; to manufacture and sell motor car parts and accessories and operate a garage. Incorporators: H. E. Bridges, J. C. Scott, J. C. Bailey, W. D. Keysey and A. C. Fant.

Virginia

ROANOKE—Overland Roanoke Co.; capital, $4,500; to deal in motor cars. Incorporators: Gordon Lefebre and F. S. Cooper, both of Roanoke, and others.

Washington

BELLINGHAM—Whatcom Auto Co.; capital, $5,000; to deal in motor cars. Incorporators: Perry B. Newkirk, Frank W. Radley and Thomas R. Waters, all of Bellingham.

EVERETT—Mackey Bros.; capital, $2,500; to deal in motor cars. Incorporators: James Mackey, George Mackey and others.

KENNEWICK—Kennewick Auto Co.; capital, $3,000; to deal in motor cars. Incorporators: John A. Penn, William L. Muncey, D. M. Williams, J. E. McKinney and L. H. Marks.

GARAGES AND ACCESSORIES

Alabama

BIRMINGHAM—Universal Service System; capital, $10,000; to conduct a general motor vehicle business. Incorporators: F. J. Bradley, W. C. Nabb and others.

Canada

QUEBEC CITY, ONT.—Safety Tire Co.; capital, $1,000,000.

MONTREAL, QUE.—Higgins & Lee Motor Supplies; capital, $50,000; manufacturers' agents and dealers in motor car supplies. Incorporators: R. S. Higgins and others.

Delaware

WILMINGTON—Storage Battery Locomobile Co.; capital, $50,000; to manufacture and sell storage batteries and electrical machinery. Incorporators: C. B. Bishop, C. J. Jacobs and H. W. Davis, all of Wilmington.

Illinois

CHICAGO—Century Auto Tire & Supply Co.; capital, $10,000; to manufacture and deal in motor car accessories. Incorporators: B. M. Goff, C. A. Wever and B. M. Goff.

CHICAGO—Chicago Auto Equipment Co.; capital, $2,500. Incorporators: Harold M. Behan, Emil Fantana and William H. Dellenback.

Louisiana

SHREVEPORT—Shreveport Overland Co.; capital, $50,000; to conduct a general motor vehicle business.

Michigan

DETROIT—Detroit Enclosed Body Co.; capital, $10,000. Incorporators: Carl A. Zeiler, Jr.; Gerald Wright and Grover Farnsworth.

DETROIT—National Motor Appliance Co., capital, $25,000. Incorporators: Sidney B. Winn, Nathan H. Jewett and Howard Streeter.

DETROIT—R. T. W. Auto Accessory Co.; capital, $5,000. James H. Pratt, William H. Lankin and Edward W. Mills.

New York

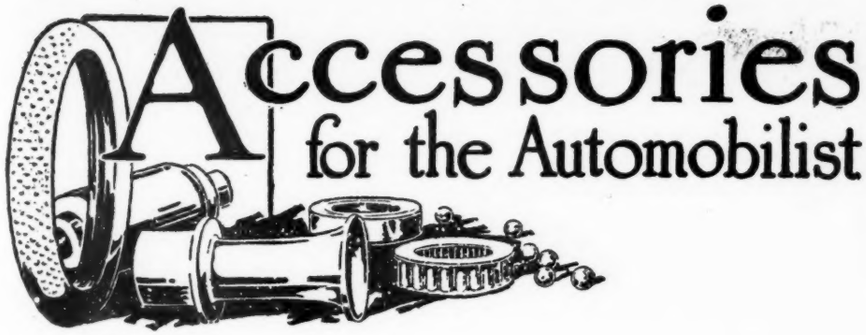
BROOKLYN—Whipple Garage; capital, $3,000. Incorporators: Edward Appel, 443 East 138th street, New York; John C. Wolff, 27 North Washington street, Jamaica; James E. McKenna, 29 Boerum place.

NEW YORK—Æon Garage Corporation; capital, $500. Incorporators: Sumner Gerard and Nathan A. Smyth, both of 50 Broadway; Lorne A. Scott, 243 West 55th street.

NEW YORK—The 474 West 130th Street Garage; capital $1,000; to operate a garage. Incorporators: George A. Adams, 149 Church street; Bernard Lion, 456 Washington street; Charles Goldman, 41 Park Row.

NEW YORK—Motor Devices Co.; capital, $30,000; motor car accessories. Incorporators: William A. Allen, Yonkers; Auckland B. Cordner, 1733 Broadway; David Wills, 954 Boulevard, Astoria, L. I.

NEW YORK—Washington Heights Auto Tire Works; capital, $5,000. Incorporators: William J. Buckley and Edward Buckley, both of 1748 Amsterdam avenue; William F. Keyes, 526 West 145th street



DETROIT Ball Bearing Universal—A universal of the ball bearing type is shown in Fig. 1. The body of the universal, which is keyed to the gearset, or the bevel pinion shaft, as the case may be, is fitted with four cylindrical grooves. The other member of the universal works in two of these grooves. Friction is largely eliminated because the sliding member is equipped with balls which are attached to a cross-arm.

Several advantages are claimed for this device. In the first place the joint has a smooth exterior; second, it may be easily taken apart by simply unbolting the flange which is keyed to the shaft at one end; third, it will retain its lubrication indefinitely, as there is only one opening to the joint and this is closed by a simple leather sleeve. The joint not only allows a full universal action but also sufficient longitudinal movement so that it acts as a slip joint. It is further claimed that it is cheap to manufacture, almost frictionless and extremely strong. It is made by the Universal Metal Products Co., 518 Woodbridge street, Detroit, Mich.

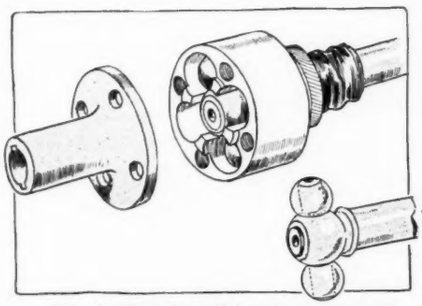


Fig. 1—Detroit ball-bearing universal

Electric Safety Signal—To prevent the theft of the car, William Bogler, Hastings, N. Y., has invented an automatic switch which sounds a bell, operates the electric horn or both whenever the starting switch is turned on. This will scare away anyone trying to steal the car. In addition it locks the ignition or electric starting circuit. It is shown in Fig. 2.

The whole apparatus is enclosed in an iron box 2½ by 6 inches, which is made fast to back of dash board under the hood and all that will show is the lock face about 1 inch in front of dash board.

Enclosed in the iron box there is a Yale two-way lock with copper switch blades fastened to the lock bolt, insulated with fiber and connecting with switch points to circuit.

With the key turned to the right, the circuit is closed for running. When one stops his car he throws his switch to off position, turns the key to the left, removes it from the lock and places it in his pocket, the car is then locked and cannot be run without the key. The lock is pick proof and there are no two keys the same.

Should anyone try to steal the car the first thing he would do would be to throw switch to starting position, since the circuit is open through the right side of lock switch, the car could not be run; but the minute the switch was closed it would make a circuit through the left side of lock switch, connecting with a bell which is also enclosed in the same box, which would sound an alarm.

The bell circuit can also be connected in series with electric horn if desired, which would make a double alarm. This switch can be used with any of the starting systems now in use.

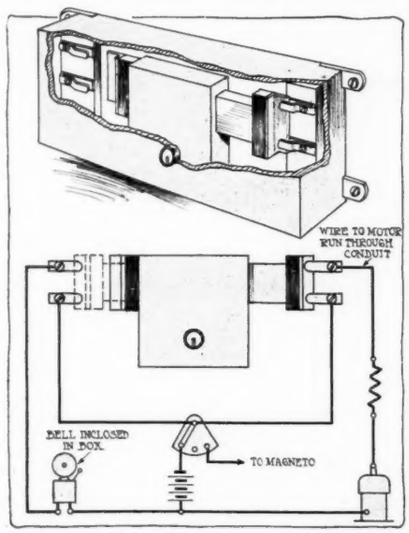


Fig. 2—Electric Safety Signal. Upper view shows the switch and the lower one the connections

Hoggson Joyometer—A device, Fig. 3. for recording the use of motor vehicles, has been patented by S. H. Hoggson, 108 Fulton street, Brooklyn, N. Y. It consists of an eight-day clock movement, which is connected to a printing device which records the divisions of time on a strip of paper tape. Connected with the device is a delicately balanced horizontal pendulum which operates a steel perforating needle that perforates small holes in the paper tape corresponding to the undulations of the car when in motion. When the car is started the recorder begins a series of perforations on the tape, which continues as long as the car runs, and ceases upon the stopping of the car, the perforations being made on the tape at the proper time as indicated by the hands on the clock. The record can be removed at any time or left as long as desired. The inking is done by a special fountain pen roller to which a few drops of ink are added once or twice a year. The recorder uses plain ticker tape and a roll 1.5 inches in diameter is sufficient for a 4 months' record.

The device measures 3.75 by 8.5 inches and weighs about 4 pounds. It may be fastened to any convenient part of the car and, as it is self-contained, it is ready to operate the moment it is attached.

Climax Grease Cup—A grease cup which is designed to operate perfectly under all conditions is shown in Fig. 4. In the first place, it is a simple matter to fill it with grease, merely removing the top cover by turning it to the left a small amount. It will be noted that the cover is held in place by a bayonet locking device which is provided with a split washer to hold it securely in place. Grease cannot pass the plunger, it is stated, because it is made a close fit and is fitted with a cupped leather washer. Ball grips are used to keep the plunger from turning. The cup is made in five sizes and is threaded for ⅛ and ¼-inch standard pipe thread. It is finished in nickel and brass. The prices vary from 25 cents up, the ½-inch brass cup selling for this figure while the nickel-plated one of the same size lists at 30 cents. The 1-inch size costs 45 cents in brass and 50 cents in nickel.

Opco Carbon Remover—The American Oil Products Co., 1426 Seneca street, Buffalo, N. Y., has brought out a carbon remover which will quickly clear away the carbon deposit from the cylinders, it is stated. It is a harmless oil mixture, according to the manufacturer, which penetrates, softens and burns out the carbon. It sells for $1 per quart, this amount be-

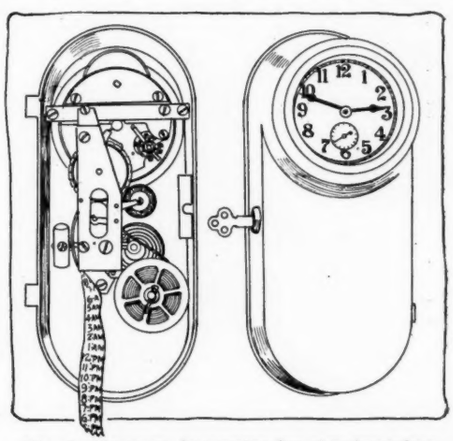


Fig. 3—Hoggson Joyometer for showing when the car is used

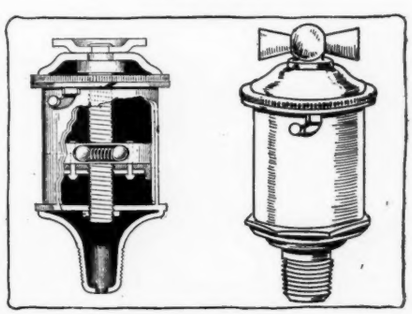


Fig. 4—Climax grease cup with quick detachable top

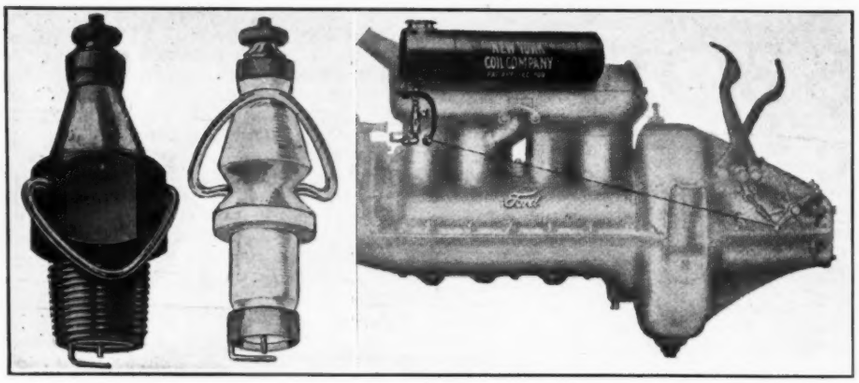


Fig. 5—Left—Bobra quick detachable spark plug. Fig. 6—Right—Ford lubricator made by the New York Coil Co.

ing sufficient for 10 to 15 cleanings.

For ordinary cases the motor is warmed and then about 4 ounces of the remover is put into each cylinder for about 5 minutes, then the motor is started and the carbon is blown out of the exhaust valves. If the motor is badly sooted, the liquid should be left in over night. After the motor is once thoroughly cleaned in this manner it is recommended to put a small amount of the liquid in each week to keep the cylinders clean.

Bobra Spark Plug—A quick detachable spark plug in which the electrode may be removed from the shell of the plug by the simple movement of a wire bail is shown in Fig. 5. It is known as the Bobra and is manufactured by the Bobra Spark Plug Co., Dayton, O. The plug is made in just two pieces, the shell and the insulator. The half-tone illustration shows the plug complete while the dotted line drawing shows the insulator. It will be noted that the two parts of the plug are held together by the eccentric movement of the bail. When the bail is swung up the insulator is rotated a small amount axially when it is free to be lifted out of the shell, the ends of the bail passing up out of the slots in the shell. It is stated that while this fastening is very simple it makes the joint between the two parts perfectly gastight.

The advantages claimed for this plug are many. The insulator may be quickly cleaned of deposited carbon or oil, and the points of the electrodes may be instantly inspected and smoothed off. The spark gap may be adjusted by moving the center electrode in or out, but once this adjustment is made there is no possibility of it being accidentally altered by taking the insulator in or out of the shell. Convenient priming of the motor in cold weather is obtained without the use of priming cocks by merely removing the insulator. In this way the plug is of particular advantage to engines such as are used on Ford cars which possess no priming cocks. It is further claimed that manufacturers of automobiles may avoid the expense of priming cocks by fitting these spark plugs.

The Bobra plug is furnished in the three standard sizes, S. A. E., ½-inch standard and metric. The price is $1.

New Lubricator for Fords—A lubricating system, which is designed to work in conjunction with the present system on a Ford car but which has the advantage of maintaining a constant level in the crankcase, is announced by the New York Coil Co., New York. The system

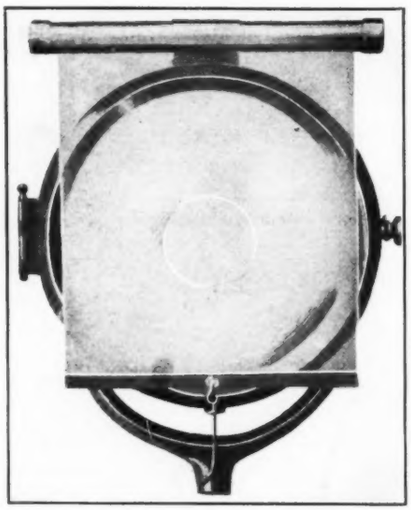


Fig. 6—Safety First headlight shades

operates without the use of gears, belts, rods, etc., and supplies oil to the crankcase at the same rate that it is consumed. The new lubricator consists of a round steel tank 4 inches in diameter and 16 inches long fastened by means of two clamps to the top of the cylinder casting, as shown in Fig. 6. A cock with a long lever is connected by steel wire to the emergency brake.

As it is necessary to apply the emergency brake in order to release the clutch before the operator can leave the car the oiler is automatically stopped, and as the brake must be moved forward to start the car the oiler starts and continues oiling as long as the car is in operation.

A needle valve regulating adjustment is provided, together with a glass sight feed, which is set to deliver oil to the crankcase in the same proportion that oil is consumed by the engine. The regular oiling system performs as usual, but by this attachment the level is kept constant.

A copper tube is supplied with a connection to attach to the oiler; its other end has a fitting adapted to connect to a special hollow bolt, also furnished, which is screwed in place of the bolt that extends through the oil filler spout found on Fords.

The lubricator sells for $10 and it can be installed easily with the use of a wrench in less than half an hour.

Safety First Headlight Shades—For the purpose of toning down the blinding glare of the headlights, Smith Bros., Auburn, N. Y., are marketing a headlight shading device which diffuses the concentrated rays produced by the ordinary headlight lenses.

The device consists of two roll curtains made of translucent fabric which, when down, cover the front of the lamps. When not in use these curtains fold and roll up into suitable cylindrical metal containers attached to the tops of the lamps. Pressing a pedal draws down both shades and locks them in place, and a simple releasing movement allows them to fly back out of the way. The device complete with all fittings costs $10. The construction is such that the parts cannot rattle and are rain and mud proof, it is stated.

Very little light is lost in passing through these shades, the effect being merely to diffuse the rays and not to dim them.

Apex Automatic Electric Tire Pump—A small direct electric driven tire pump, Fig. 7, for the private garage is manufactured by the Apex Electric Mfg. Co., 1410 West Fifty-ninth street, Chicago, Ill. It will inflate a 3 to 3.5-inch tire of ordinary size in 3 to 3.5 minutes.

The cylinders and pistons are accurately ground and lapped together. The piston has two Leak-Proof rings and the bearings are of phosphor bronze and hardened and ground steel. There is an automatic cut-off at the base which shuts off the power the moment the desired air-pressure in the tires is reached. The motor used is a ⅛ horsepower Western Electric. The pump overall measures 13 inches, it is 12.5 inches high and 8 wide. The equipment includes 10 feet of hose and a lamp cord of the same length. The price is $45.

Apex Multiple-Kartridge Electric Soldering Iron—Another device put out by this concern for the automobile trade is an electric soldering iron, known as the Apex Multiple-Kartridge Electric Soldering Iron. It is stated that the electric current keeps the tip at an even temperature. Time is saved because there is none lost in reheating the iron and due to the fact that the tip never scales and therefore no scraping or filing of the tip is required.

The peculiar feature of this iron is the use of different heating elements to give various degrees of heat as are required for different kinds of work. These units are in the form of cartridges and when the temperature is to be changed a new one may quickly be substituted for the one in use.

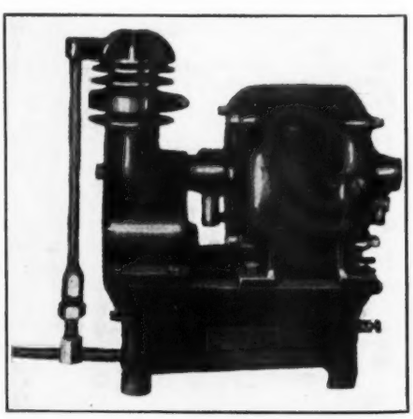


Fig. 7—Apex automatic electric tire pump